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JP05065571	High strength tial intermetallic compound HONDA MOTOR
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JP05065560	Production of high strength and high ductility tial intermetallic compound HONDA MOTOR
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JP05065574	High toughness and high ductility tial intermetallic compound HONDA MOTOR
JP05059464	Oxidation resistant tial intermetallic compound material and production of it HONDA MOTOR
JP05059476	High toughness and high ductility tial intermetallic compound HONDA MOTOR
JP05059469	High toughness and high ductility tial intermetallic compound HONDA MOTOR
JP05051681	High strength tial intermetallic compound HONDA MOTOR
JP05051680	Tial intermetallic compound having high strength, high toughness, and high ductility HONDA MOTOR
JP05051679	Tial intermetallic compound having high toughness and ductility HONDA MOTOR
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JP05051677	Tial intermetallic compound having high toughness and ductility HONDA MOTOR
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JP05070861	Production of structural member made of high-toughness and ductility intermetallic compound HONDA MOTOR
JP05065558	Manufacture of high strength and high ductility ti-al intermetallic compound HONDA MOTOR
JP05065563	Manufacture of high toughness and ductility ti-al intermetallic compound HONDA MOTOR
JP05059507	Manufacture of creep resistance ti-al based intermetallic compound HONDA MOTOR
JP04210401	Production of structural member made of tial intermetallic compound HONDA MOTOR

TiAl-based intermetallic compound piston ring and process for treating the surfaces thereof

JP07083330

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHIYA
  TOKUNE TOSHIO
  KANOYA IZURU
- **International Patent Classification**
  C22C-014/00 C22C-019/00 C23C-014/00 C23C-014/02 C23C-014/06 C23C-014/32 F02F-005/00 F16J-009/26
- **CPC Code**
  C22C-019/00; C23C-014/00/21; C23C-014/06/41; F05C-2201/021; F05C-2201/0412; F16J-009/26

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- **Fampat family**

JPH0783330	A	1995-03-28	[JP07083330]
EP0645463	A2	1995-03-29	[EP-645463]
EP0645463	A3	1995-05-17	[EP-645463]
JPH07243020	A	1995-09-19	[JP07243020]
EP0645463	B1	1997-12-29	[EP-645463]
DE69407525	D1	1998-02-05	[DE69407525]
DE69407525	T2	1998-04-16	[DE69407525]

- **Abstract:**
  (EP-645463)
  A piston ring for an internal combustion engine is formed of a TiAl-based intermetallic compound having a volume fraction Vf of L10 type TiAl (gamma -phase) in a range represented by Vf >/= 30%. Such piston ring has a light weight, a high rigidity and a high limit of the number of revolutions (rpm) of the engine. The piston ring is subjected to a thermal treatment, preferably between about 500 DEG C and 900 DEG C, and then a thin film of titanium nitride, chromium nitride, titanium-aluminum nitride or the like is formed on the surfaces by a physical vapor deposition process, such as ion-plating.. <IMAGE>

Claims

(EP-645463)

1. A piston ring formed of a TiAl-based intermetallic compound having a volume fraction Vf of L10 type TiAl represented by Vf >= 30%.
2. A piston ring according to claim 1, wherein said volume fraction Vf of Ll0 type TiAl is in a range represented by Vf >= 40%.
3. A process for treating a surface of a piston ring made of a TiAl-based intermetallic compound, comprising a step of forming a thin film on a surface of the piston ring by a physical vapor deposition, wherein a residual strain in said piston ring is removed by subjecting said piston ring to a thermal treatment prior to the formation of the thin film by said physical vapor deposition.
4. A process for treating a surface of a piston ring made of a TiAl-based intermetallic compound according to claim 3, wherein a thermal treatment temperature T in said thermal treatment is set in a range represented by 500 DEG.C <= T <= 900 DEG.C.
5. A process for treating a surface of a piston ring made of a TiAl-based intermetallic compound according to claim 3 or 4, wherein said physical vapor deposition is an ion-plating.
6. A process for treating a surface of a piston ring made of a TiAl-based intermetallic compound according to claim 3, or 4, wherein said thin film is formed of a nitride selected from the group consisting of titanium nitride, chromium nitride and titanium-aluminum nitride.
7. A process for treating a surface of a piston ring made of a TiAl-based intermetallic compound according to claim 5, wherein said thin film is formed of a nitride selected from the group consisting of titanium nitride, chromium nitride and titanium-aluminum nitride.
8. A piston ring according to claim 1 or 2, wherein said TiAl-based intermetallic compound is substantially Ti49.6 Al4 5 V2 Nb2 B1.4 .
9. A piston ring according to the process of claim 3 or 4, wherein said TiAl-based intermetallic compound is Ti49.6 Al4 5 V2 Nb2 B1.4 .
10. A piston ring formed of a TiAl-based intermetallic compound having a volume fraction Vf of L10 type TiAl represented by Vf >= 30% and having a thin film formed on a surface of the piston ring by a physical vapor deposition, wherein said piston ring is subjected to a thermal treatment prior to the formation of said thin film for removing a residual strain in said piston ring.
11. A piston ring according to claim 10, wherein a thermal treatment temperature T in said thermal treatment is set in a range represented by 500 DEG.C <= T <= 900 DEG.C.
12. A piston ring according to claim 10 or 11, wherein said physical vapor deposition is an ion-plating.
13. A piston ring according to claim 10 or 11, wherein said thin film is formed of a nitride selected from the group consisting of titanium nitride, chromium nitride and titanium-aluminum nitride.

High strength and high ductility TiAl-based intermetallic compound
EP-634496

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHIYA
  TOKUNE TOSHIO
- **International Patent Classification**
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- **US Patent Classification**
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- **CPC Code**
  C22C-014/00

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- **Priority Details**
  1993JP-0174476 1993-07-14
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- **Fampat family**

EP0634496	A1	1995-01-18	[EP-634496]
JPH0776745	A	1995-03-20	[JP07076745]
US5514333	A	1996-05-07	[US5514333]
EP0634496	B1	1997-11-05	[EP-634496]
DE69406602	D1	1997-12-11	[DE69406602]
DE69406602	T2	1998-03-26	[DE69406602]
JP3626507	B2	2005-03-09	[JP3626507]

- **Abstract:**

(EP-634496)
A high strength and high ductility TiA1-based intermetallic compound includes a content of aluminum in a range represented by 42.0 atom % </= A1 </= 50.0 atom %, a content of vanadium in a range represented by 1.0 atom % </= V </= 3.0 atom %, a content of niobium in a range represented by 1.0 atom % </= Nb </= 10.0 atom %, a content of boron in a range represented by 0.03 atom % </= B </= 2.2 atom %, and the balance of titanium and unavoidable impurities. A product of the TiA1-based intermetallic compound is formed by only casting or casting followed by a homogenizing thermal treatment. <IMAGE>

Claims

(EP-634496)

1. A high strength and high ductility of TiA1-based intermetallic compound comprising a content of aluminum (A1) in a range represented by 42.0 atom % <= A1 <= 50.0 atom %, a content of vanadium (V) in a range represented by 1.0 atom % <= V <= 3.0 atom %, a content of niobium (Nb) in a range represented by 1.0 atom % <= Nb <= 10.0 atom %, a content of boron (B) in a range represented by 0.03 atom % <= B <= 2.2 atom %, and the balance of titanium and unavoidable impurities.

2. A high strength and high ductility TiA1-based intermetallic compound according to claim 1, wherein the main phase is an L10 type gamma phase, a ratio c/a between both lattice constants "a" and "c" in the crystal structure o said L10 type gamma phase being in a range represented by c/a <= 1.015.

3. A high strength and high ductility TiA1-based intermetallic compound according to claim 2, wherein relationship between both lattice constants is c/a > 1.0.

4. A high strength and high ductility TiA1-based intermetallic compound according to claim 1, wherein the main phase is an L10 type gamma phase having a volume fraction percent equal to or greater than 80%.

5. A method for producing a high strength and high ductility TiAl-based intermetallic compound, comprising the steps of:

preparing a blank which includes a content of aluminum (Al) in a range represented by 42.0 atom % <= Al <= 50.0 atom %, a content of vanadium (V) in a range represented by 1.0 atom % <= V <= 3.0 atom %, a content of niobium (Nb) in a range represented by 1.0 atom % <= Nb <= 10.0 atom %, a content of boron (B) in a range represented by 0.03 atom % <= B <= 2.2 atom %, and the balance of titanium and unavoidable impurities;

melting said blank to provide a molten metal;

casting said molten metal to provide an ingot;

and

subjecting said ingot to a homogenizing thermal treatment.

TiAl-based intermetallic compound
EP-592189

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHIYA
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18
- **US Patent Classification**
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- **CPC Code**
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- **Publication Information**
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- **Priority Details**
  1992JP-0290800 1992-10-05

- **Fampat family**

EP0592189	A1	1994-04-13	[EP-592189]
JPH06116692	A	1994-04-26	[JP06116692]
US5431754	A	1995-07-11	[US5431754]
EP0592189	B1	1998-07-08	[EP-592189]
DE69319530	D1	1998-08-13	[DE69319530]
DE69319530	T2	1998-10-29	[DE69319530]

- **Abstract:**

(EP-592189)
A TiAl-based intermetallic compound has a metallographic structure which includes a region A having fine beta -phases dispersed in a gamma -phase. The volume fraction Vf of the beta -phases in the region A is set equal to or more than 0.1% (Vf >= 0.1%). Thus, the beta -phases can exhibit a pinning effect to prevent a transgranular pseudo cleavage fracture in the gamma -phase, thereby providing an enhanced high-temperature strength of the TiAl-based intermetallic compound.

Claims

(EP-592189)

1. A TiAl-based intermetallic compound with an excellent high-temperature strength, wherein said compound has a metallographic structure which comprises a region having fine beta -phases dispersed in a gamma -phase, the volume fraction Vf of beta -phases in said region being equal to or more than 0.1% (Vf >= 0.1%)
2. A TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 1, wherein alpha 2 -phases are dispersed in the gamma -phase in said region.
3. A TiAl-based intermetallic compound with an excellent high-temperature strength, wherein said compound has a metallographic structure which comprises a first region having fine beta -phases dispersed in a gamma -phase, and a second region having a gamma -phase which does not include beta -phase, the volume fraction Vf of the beta -phases in said first region being equal to or more than 0.1% (Vf >= 0.1%).
4. A TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 3, wherein alpha 2 -phases are dispersed in the gamma -phase in said first region.
5. A TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 3 or 4, wherein the volume fraction Vf of said first region in said metallographic structure is equal to or more than 1% (Vf >= 1%).
6. A TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 1, 2, 3 or 4, further including at least one beta -area enlarging element E selected from the group consisting of Mo, Nb, Ta, V, Co, Cr, Cu, Fe, Mn, Ni, Pb, Si and W, the content of said beta -area enlarging element E being equal to or more than 0.5 atomic % (E >= 0.5 atomic %).
7. A process for producing a TiAl-based intermetallic compound with an excellent high-temperature strength, having a metallographic structure which comprises;
a first region consisting of either a region having fine beta -phases dispersed in a gamma -phase or a region having alpha 2 -phases and fine beta -phases dispersed in a gamma -phase, and a second region having a gamma -phase which does not include beta -phase, the volume fraction Vf of beta -phases in said first region being equal to or more than 0.1% (Vf >= 0.1%);

said process comprising:
a first step of subjecting a TiAl-based intermetallic compound blank having a metallographic structure including a gamma -phase and at least one of alpha 2 - and beta -phases to a solution treatment at a treatment temperature set in a range which permits alpha - and gamma -phases to be present;

quenching said TiAl-based intermetallic compound blank thereby providing an intermediate product having a metallographic structure including gamma -phases and supersaturated alpha 2 -phases;
and
a second step of subjecting said intermediate product to an artificial aging treatment at a temperature set in a range which permits alpha 2 - and gamma -phases to be present.
8. A process for producing a TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 7, wherein the treatment temperature in said solution treatment is equal to or more than an eutectoid line EL which permits a reaction, alpha -phase + gamma -phase --> alpha 2 -phase + gamma -phase, to occur, but is equal to or less than alpha -trasus line TL which permits a reaction, alpha -phase --> alpha -phase + gamma -phase, to occur;
and the treatment temperature in said artificial aging treatment is equal to or more than 700 DEG.C, but is equal to or less than said eutectoid line EL .
9. A process for producing a TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 7 or 8, wherein a cooling rate of said quenching is set higher than the cooling rate of an oil quenching.
10. A process for producing a TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 7 or 8, wherein the heating time of said solution treatment is set equal to or more than 5 minutes.
11. A process for producing a TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 7 or 8, wherein the heating time in said artificial aging treatment is set equal to or more than 5 minutes.
12. A process for producing a TiAl-based intermetallic compound with an excellent high-temperature strength according to claim 7 or 8, wherein said TiAl-based intermetallic compound blank further includes at least one beta -area enlarging element E selected from the group consisting of Mo, Nb, Ta, V, Co, Cr, Cu, Fe, Mn, Ni, Pb, Si and W, the content of said beta -area enlarging element E being equal to or more than 0.5 atomic % (E >= 0.5 atomic %).

TiAl ALLOY FOR AIR INTAKE/EXHAUST VALVE AND METHOD FOR MANUFACTURING THE SAME

JP2010270347

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  SANADA YASUHEI
  MINATO SADAYOSHI

- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18 F01L-003/02
- **Publication Information**
  JP2010270347 A 2010-12-02 [JP2010270347]
- **Priority Details**
  2009JP-0120914 2009-05-19

- **Fampat family**

JP2010270347	A	2010-12-02	[JP2010270347]

- **Abstract:**
  (JP2010270347)
  PROBLEM TO BE SOLVED: To provide a TiAl alloy for an air intake/exhaust valve, which has a lower specific gravity and a higher rigidity than a conventional Ti alloy and furthermore has an improved toughness compared with the conventional TiAl alloy, to provide a method for manufacturing the same, and to increase a rotation speed of an engine and improve an output power by realizing valve parts with light weight and high rigidity. SOLUTION: This manufacturing method includes subjecting the TiAl alloy having a composition including 8.0-9.5 wt.% Al and the balance Ti to aging heat treatment at 600-900 deg.C for 40 hours or longer. COPYRIGHT: (C)2011,JPO&INPIT

Claims

(JP2010270347)

1. Constitution Al: The TiAl alloy which consists of 8.0-9.5wt% and remainder Ti, in the 600-900.deg.C aging of 40 hours or more production method of the TiAl alloy for the inhalation and exhalation of air valve which features that it heat-treats.
2. When in the aforementioned constitution, furthermore, Fe, Cr and Mo, V, among Nb 1 kinds are added at least, the value of wt% of those addition quantities being used [for several 1] formulas below, in the claim 1 which features that the Mo equivalence becomes 5.7 or less production method of TiAl alloying for the inhalation and exhalation of air valve statement.

[Several 1]
Mo equivalence =Mo+2.5Fe+1.25Cr+0.67V+0.28Nb
3. Constitution Al: The TiAl alloy for the inhalation and exhalation of air valve which features that Ti3Al of 30-50vol% is precipitating in .alpha.-Ti at the time of TiAl alloying which consists of 8.0-9.5wt% and remainder Ti.
4. In the aforementioned constitution, furthermore, Fe, Cr and Mo, V, being the TiAl alloy which among Nb at least adds 1 kinds, when using the value of wt% of those addition quantities [for several 2] formulas below, in the claim 3 which features that the Mo equivalence becomes 5.7 or less the TiAl alloy for the inhalation and exhalation of air valve of statement.

[Several 2]
Mo equivalence =Mo+2.5Fe+1.25Cr+0.67V+0.28Nb

INTERNAL COMBUSTION ENGINE COMPONENT MADE OF TiAl ALLOY
JP2010280927

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUCHIYA MASAYUKI
  MINATO SADAYOSHI
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/02 C22F-001/18

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  2009JP-0132652 2009-06-02

- **Fampat family**

JP2010280927	A	2010-12-16	[JP2010280927]

- **Abstract:**
  (JP2010280927)
  PROBLEM TO BE SOLVED: To provide a TiAl-made internal combustion engine component, particularly a valve or a piston pin, which has high temperature high strength and high rigidity, and also is improved in ductility. SOLUTION: The internal combustion engine component are produced through: an extruding process where a TiAl alloy containing, by atom, 40 to 42% Al and 2.4 to 2.6% Cr, and the balance Ti with inevitable impurities is extruded at 1,100 to 1,150 deg.C at an extrusion ratio of >=10 so as to obtain a molded body; an annealing process where, after the completion of the extruding process or during the extruding process, the molded body is held at 950 to 1,050 deg.C for 2 to 5 h in a vacuum; and a cooling process where the molded body subjected to the annealing process is cooled to 400 deg.C at a cooling speed of 10 to 60 deg.C/min in an inert gas. COPYRIGHT: (C)2011,JPO&INPIT

Claims

(JP2010280927)

1. Al 40-42atom% and Cr: 2.4-2.6atom% it contains, the TiAl alloy where the remainder consists of Ti and the inevitable impurity, extrusion ratio 10 or more with the 1100-1150.deg.C, extrusion process and the description above which obtain the extrusion molding body the aforementioned compact being true aerial after the extrusion process ending, or in extrusion process the aforementioned compact where annealing process and the aforementioned annealing process which 2-5 time you keep with the 950-1050.deg.C end in the inert gas passing with the cooling process which cools at cooling rate of 10-60.deg.C/amount to the 400.deg.C, the TiAl alloy make internal combustion engine part which features that it is produced.
2. As for the aforementioned TiAl alloy, Nb: 1.3-1.9atom% and Zr: In the claim 1 which features that at least 1 kinds of 0.1-0.2atom% furthermore are contained the TiAl alloy make internal combustion engine part of statement.
3. In the claim 1 which features that aforementioned compact which passes the aforementioned cooling process the 20-35 volume % contains .beta.-Ti phase, at the same time .alpha.2 (Ti3Al) the 10-20 volume % contains phase or 2 the TiAl alloy make internal combustion engine part of statement.
4. The aforementioned internal combustion engine part, in either of the claim 1-3 which features that it is the valve or the piston pin the TiAl alloy make internal combustion engine part of statement.

Melting method of addition metal to TiAl based intermetallic
JP08246081

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  IENAGA YUICHI
  NAKAGAWA TATSUYA
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  SHIKAYA IZURU
- **International Patent Classification**
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- **Publication Information**
  JPH08246081 A 1996-09-24 [JP08246081]
- **Priority Details**
  1995JP-0044370 1995-03-03

- **Fampat family**

JPH08246081	A	1996-09-24	[JP08246081]
JP3802579	B2	2006-07-26	[JP3802579]

- **Abstract:**
  (JP08246081)
  PURPOSE: To stably improve the yield of an additional metal, at the time of melting the additional metal having the m.p. higher than that of a metal as the essential component in the metal as the essential component, by pouring the green compact of the low m.p. easily meltable metal and the additional metal having higher m.p. into the molten metal of the additional metal having higher m.p. CONSTITUTION: For example, at the time of adding a Ti-Al intermetallic compound added with B having the m.p. higher than that of the same and executing melting in a molten metal M of the Ti-Al intermetallic compound, a small cylindrical green compact G composed the B powder and Al powder having the m.p. lower than the Ti-Al intermetallic compound is produced. When this green compact G is poured into the molten metal M of the Ti-Al intermetallic compound, the Al powder is melted, and simultaneously, the B powder in the vicinity of the same is also divided individually, which is brought into contact with the molten metal M, and melted. Thus, the B powder can be melted without generating the remainder of its melting in a relatively short period.

Claims

(JP08246081)

1. In basis metal, that basis metal compared to high
When it is and it melts the addition metal which possesses fusion point, the aforementioned addition gold
The divination which possesses the fusion point which is lower than the being attached powder and the aforementioned basis metal
The compact which consists of with the powder of the molten characteristic metal, the aforementioned basis metal
The addition metal which features that it throws in the hot water melting
Law.
2. The aforementioned basis metal Ti or TiAl system
It is one kind of intermetallic, the aforementioned addition metal is B,
The aforementioned fusible characteristic metal is Al, the addition metal of claim 1 statement
Melting method.
3. Manufacturing the hot water of the aforementioned basis metal and the description above
In melting of the addition metal, [indakushiyo] which has the water cooling crucible
It can use the [nsukaru] fusion furnace, claim 1 or 2 statements
Melting method of addition metal.

Core for casting ti or ti alloy or tial intermetallic compound hollow casting JP08238538

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  NAKAGAWA TATSUYA
  IENAGA YUICHI
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  KANOYA IZURU
- **International Patent Classification**
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- **Publication Information**
  JPH08238538 **A 1996-09-17 [JP08238538]**
- **Priority Details**
  1995JP-0043296 1995-03-02

- **Fampat family**

JPH08238538	A	1996-09-17	[JP08238538]

- **Abstract:**
  (JP08238538)
  PURPOSE: To provide a pin shaped core which is used in obtaining right stock for piston pin when a hollow piston pin is cast with using molten metal having TiAl intermetallic compound composition. CONSTITUTION: A pin shaped core 8 is made of ferrous alloy material and the volume rate R of piston pin stock to whole volume is set to R>=17%. Ferrous alloy material has low reactivity with molten Ti, because of the volume rate set as such, the pin shaped core has enough heat capacity. By this method, fusion of the pin shaped core 8 is prevented during casting. COPYRIGHT: (C)1996,JPO

Claims

(JP08238538)

1. Ti or Ti alloy or TiAl system
The core which is used for casting the hollow molding which consists of the intermetallic
So being, to be constituted from the Fe based alloy material, at the same time the aforementioned air
The molding (1) the cubic measure ratio R for cubic measure is R>=17%
Thing is featured, Ti or Ti alloy or TiA
Core for l based intermetallic hollow molding casting.
2. As for the aforementioned Fe based alloy material, rolling the general structure
Steel and general steel for cold finished steel bars, cold finished steel bars, [kuromumori]
The kind which is selected from the [buden] steel steel or the stainless steel stick
So it is, Ti or Ti alloy or T of claim 1 statement
Core for iAl based intermetallic hollow molding casting.
3. Mold for centrifugal casting (M) with component [a]
[ru], claim Ti or Ti alloy of 1 or 2 statements and
Core for TiAl based intermetallic hollow molding casting.

High strength and high ductility tial intermetallic compound
JP07233431

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI
  SHIKAYA IZURU
- **International Patent Classification**
  C22C-014/00 C22C-032/00

- **Publication Information**
  JPH07233431 A 1995-09-05 [JP07233431]
- **Priority Details**
  1994JP-0051229 1994-02-24

- **Fampat family**

JPH07233431	A	1995-09-05	[JP07233431]

- **Abstract:**
  (JP07233431)
  PURPOSE: To obtain a TiAl intermetallic compd. having considerably and improved strength and ductility by forming a specified amt. of a lamellar phase in the matrix of a TiAl intermetallic compd. and dispersing a specified amt. of TiB in the matrix. CONSTITUTION: A molten metal is prepd. using sponge titanium, fine aluminum particles, an Al-V alloy and an Al-Nb alloy, and an ingot of a Till intermetallic compd. is produced by casting and subjected it to hot isostatic pressing to obtain the objective high strength and high ductility TiAl intermetallic compd. with a matrix in which the volume fraction of a lamellar phase consisting of an .alpha.-phase (Ti(sub 3)Al phase and a .gamma.-phase (TiAl phase) is >=15% and TiB is dispersed in the matrix in a volume fraction of 0.1-15%. COPYRIGHT: (C)1995,JPO

Claims

(JP07233431)

1. I [2] the body of the lamella phase which consists of phase and I phase
The matrix where integral calculus ratio Vf is Vf>=15% and, that
To disperse to the matrix, at the same time cubic measure amount ratio Vf the 0.1%<=
It features that it possesses TiB which is Vf<=15%
High intensity, high ductile TiAl based intermetallic.
2. The cubic measure amount ratio V of TiB in all boride
f is Vf>=30%, high intensity of claim 1 statement, high extending
Characteristic TiAl based intermetallic.

Tial type intermetallic compound having high strength and high ductility and its production

JP06228705

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI

- **International Patent Classification**
  C22C-001/00 C22C-014/00 C22C-029/14 C22C-029/16 C22C-032/00 C22F-001/18
- **Publication Information**
  JPH06228705 A 1994-08-16 [JP06228705]
- **Priority Details**
  1993JP-0039504 1993-02-03

- **Fampat family**

JPH06228705	A	1994-08-16	[JP06228705]

- **Abstract:**
  (JP06228705)
  PURPOSE: To provide a TiAl type intermetallic compound having superior ductil ity at ordinary temp. and strength. CONSTITUTION: In this TiAl type intermetallic compound, Al content is regulated to 38 to 52atomic% and metallic structure has a lamellar structure region L where .alpha.(sub 2)-phases and .gamma.-phases exist in layers, and further, nitrides n(sub 1) to n(sub 3) are dispersed in the lamellar structure region L. The volume fraction V(sub 2) of the nitrides n(sub 1) to n(sub 3) is regulated to 0.01-15%. Ductility at ordinary temp. can be improved by the lamellar structure region L and strength can be improved by the nitrides n(sub 1) to n(sub 3). COPYRIGHT: (C)1994,JPO&Japio

Claims

(JP06228705)

1. Al content 38 atmoic % <=Al<=52 field
The child % being, metallographic structure the layer where I [2] phase and I phase form layer
To possess the condition organizational limits, the nitride to disperse to those stratified organizational limits, the [so]
Cubic measure amount ratio V of nitride [2] with 0.01%<=V [2] <=15%
Conversion between the high intensity high ductile TiAl metal which feature a certain thing
Combination ones.
2. Cubic measure amount ratio V of the aforementioned stratified organizational limits [1] V [1] a prg.
It is 5%, the high intensity high ductile TiAl gold of claim 1 statement
Intergeneric chemical compound.
3. The aforementioned nitride is placed next phase of the aforementioned stratified organizational limits
In order to parallel to the boundary of 2 phases, to include the needle-shaped nitride which extends, that
In the nitride ratio R of the aforementioned needle-shaped nitride [1], the aforementioned nitriding
When designating the cubic measure amount ratio of the thing as V [2], with R [1] <=0.6V [2] the [a]
[ru], claim high intensity high ductile TiAl gold of 1 or 2 statements
Intergeneric chemical compound.
4. The aforementioned nitride to include Ti [3] AlN, that
In the nitride the ratio R of Ti [3] AlN [2], the aforementioned nitride
When designating cubic measure amount ratio as V [2], with R [2] <=0.6V [2] the [a]
[ru], claim high intensity high ductility TiAl of 1,2 or 3 statements
Type intermetallic.
5. Al content 38 atmoic % <=Al<=52 field
The child % being, metallographic structure the layer where I [2] phase and I phase form layer
To possess the condition organizational limits, in those stratified organizational limits the nitride and boride
The thing to disperse, cubic measure amount ratio the body of V of that nitride [2] and boride
Harmony V of integral calculus ratio V [5] [2] +V [5] 0.01%<=V [2] +V [5]
The high intensity high ductility TiAl which features that it is the <=15%
Type intermetallic.
6. The lower limit value of Al content 46 atmoic % <=Al
The <=48 atmoic % there to be a range, in addition upper limit of Al content
49 atmoic % <=Al<=52 atmoic % there being a range, metal group
Weaving to possess the stratified organizational limits where I [2] phase and I phase form layer, that
In the material which the nitride disperses to the stratified organizational limits, the primary thermal place
Reason, to administer the secondary heat treatment which it comes after that, heat treatment of primary heat treatment
Temperature T [1], it is parent phase of I [2] phase, cubic measure amount ratio V of I phase [3]
With ratio V [3] /V with the cubic measure amount ratio V of I phase [4] [4] 0.5<=V [3]
Setting to the temperature limits which are the /V [4] <=2, the body of the aforementioned stratified organizational limits
To adjust integral calculus ratio V [1], heat treatment temperature T of secondary heat treatment [2]
Compared to heat treatment temperature [1] above the 50.deg.C it is lower T of primary heat treatment
Setting to the temperature limits, cubic measure amount ratio V of the aforementioned nitride [2] and precipitation
The high intensity high ductility TiA which features that you adjust form
Production method of l based intermetallic.
7. The lower limit value of Al content 42 atmoic % <=Al
The <=45 atmoic % there to be a range, in addition upper limit of Al content
46 atmoic % <=Al<=48 atmoic % there being a range, metal group
Weaving to possess the stratified organizational limits where I [2] phase and I phase form layer, that
In the material which the nitride disperses to the stratified organizational limits, the primary thermal place
Reason, to administer the secondary heat treatment which it comes after that, heat treatment of primary heat treatment
Temperature T [1], it is parent phase of I [2] phase, cubic measure amount ratio V of I phase [3]
With ratio V [3] /V with the cubic measure amount ratio V of I phase [4] [4] V [3] /V [4] =
2 setting to the temperature limits below the temperature which is and above the 900.deg.C, before
To adjust the cubic measure amount ratio V of the description stratified organizational limits [1], secondary heat treatment
Heat treatment temperature T [2], from heat treatment temperature T of primary heat treatment [1]
Above the 50.deg.C setting to the low temperature limits, cubic measure amount of the aforementioned nitride
Ratio it features that adjusts V [2] and precipitation form, high
Production method of strength high ductile TiAl based intermetallic.
8. The lower limit value of Al content 38 atmoic % <=Al
The <=42.5 atmoic % there to be a range, in addition the upper limit of Al content
Value 42.5 atmoic % <=Al<=45 atmoic % in range oh
The [te], metallographic structure the stratified organizational limits where I [2] phase and I phase form layer
In the material which the nitride disperses to the possessing and the stratified organizational limits,
To administer primary heat treatment and the secondary heat treatment which it comes after that, primary heat treatment
Heat treatment temperature T [1], (.alpha.+.gamma.) from phase (I [2] +.gamma.) phase
When to phase changing, rule - below irregular transformation point Tr, 90

Setting to the temperature limits above the 0.deg.C, cubic measure amount ratio of the aforementioned stratified organizational limits

[1] to adjust V, heat treatment temperature T of secondary heat treatment [2], 1

The temperature limits which compared to heat treatment temperature [1] above the 50.deg.C are lower T of the next heat treatment

Setting, cubic measure amount ratio V of the aforementioned nitride [2] and precipitation form

The high intensity high ductile TiAl gold which features that you adjust

Production method of intergeneric chemical compound.

9. As the aforementioned material, nitriding to the aforementioned stratified organizational limits

Those which the thing and boride are dispersed are used, the claim

Conversion between high intensity high ductile TiAl metal of 6,7 or 8 statements

Production method of combination ones.

High strength and high ductility tial intermetallic compound and its production JP06228685

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-001/00 C22C-014/00 C22C-021/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH06228685 A 1994-08-16 [JP06228685]
- **Priority Details**
  1993JP-0036158 1993-02-01

- **Fampat family**

JPH06228685	A	1994-08-16	[JP06228685]

- **Abstract:**
  (JP06228685)
  PURPOSE: To provide a TiAl intermetallic compd. having both excellent ductility at ordinary temp. and excellent strength. CONSTITUTION: This TiAl intermetallic compd. consists of, by atom, 42% to <46% Al, 1-4% Cr, at least, one selected among 1-4% Nb, 0.3-4% Ta, 0.05-4% W and 0.5-4% Mo and the balance Ti with inevitable impurities and has a metallic structure consisting of .gamma.-, .alpha.(sub 2)-and .beta.-phases. COPYRIGHT: (C)1994,JPO&Japio

Claims

(JP06228685)

1. Al and Cr and Nb, Ta and W and
Is selected from Mo at least to contain with the kind which, the remainder
Being Ti and the inevitable impurity,
Al content 42 atmoic % <=Al<46 atmoic %,
Cr content 1 atmoic % <=Cr<=4 atmoic %,
Nb content 1 atmoic % <=Nb<=4 atmoic %,
Ta content 0.3 atmoic % <=Ta<=4 atmoic %,
W content 0.05 atmoic % <=W<=4 atmoic %,
Mo content 0.5 atmoic % <=Mo<=4 atmoic %
between the high intensity high ductile TiAl metal which feature that is
Chemical compound.
2. Metallographic structure, I phase and I [2] phase and I phase
At least it consists of with one side, high intensity of claim 1 statement high
Ductile TiAl based intermetallic.
3. Al and Cr and Nb, Ta and W and
Is selected from Mo at least to contain with the kind which, the remainder
Being Ti and the inevitable impurity,
Al content 42 atmoic % <=Al<46 atmoic %,
Cr content 1 atmoic % <=Cr<=4 atmoic %,
Nb content 1 atmoic % <=Nb<=4 atmoic %,
Ta content 0.3 atmoic % <=Ta<=4 atmoic %,
W content 0.05 atmoic % <=W<=4 atmoic %,
Mo content 0.5 atmoic % <=Mo<=4 atmoic %
in the material which is primary heat treatment and the secondary heat treatment which it comes after that
To do, heat treatment temperature T of primary heat treatment [1], at parent phase of I [2] phase
Cubic measure amount ratio I of a certain I phase ratio .alpha./.gamma. with the cubic measure amount ratio I of I phase
To set to the temperature limits which are 0.5<=.alpha./.gamma.<=3, the secondary thermal place
Heat treatment temperature T of reason [2], I [2] phase to exist, at the same time the primary thermal place
It sets to the temperature limits which compared to heat treatment temperature [1] above the 50.deg.C are lower T of reason
Conversion between the high intensity high ductile TiAl metal which feature that it does
Production method of combination ones.
4. Al and Cr and Nb, Ta and W and
Is selected from Mo at least to contain with the kind which, the remainder
Being Ti and the inevitable impurity,
Al content 42 atmoic % <=Al<46 atmoic %,
Cr content 1 atmoic % <=Cr<=4 atmoic %,
Nb content 1 atmoic % <=Nb<=4 atmoic %,
Ta content 0.3 atmoic % <=Ta<=4 atmoic %,
W content 0.05 atmoic % <=W<=4 atmoic %,
Mo content 0.5 atmoic % <=Mo<=4 atmoic %
in the material which is primary heat treatment and the secondary heat treatment which it comes after that
To do, heat treatment temperature T of primary heat treatment [1], cubic measure amount ratio of I [2] phase
I [2] ratio I with the cubic measure amount ratio I of I phase [2]/.gamma. 0.5<=.alpha. [2]
To set to the temperature limits which are/.gamma.<=3, heat treatment of secondary heat treatment warm
Degree T [2] heat treatment temperature T of primary heat treatment [1] compared to above 50.deg.C
The high intensity high ductility T which features that it sets to the low temperature limits
Production method of iAl based intermetallic.

High strength and high toughness tial intermetallic compound
JP06049570

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-014/00 C22C-021/00 C22C-032/00

- **Publication Information**
  JPH0649570 **A 1994-02-22 [JP06049570]**
- **Priority Details**
  1992JP-0208137 1992-08-04

- **Fampat family**

JPH0649570	A	1994-02-22	[JP06049570]

- **Abstract:**
  (JP06049570)
  PURPOSE: To obtain a TiAl intermetallic compound having high strength and high toughness by specifying its metallic structure. CONSTITUTION: The metallic structure of the TiAl intermetallic compound has plural primary lamellar structural regions R. and plural secondary lamellar structural regions R(sub 2). Each primary lamellar structural region R(sub 1) is constituted by alternately laminating TiAl phases La and Ti(sub 3)Al phases Lb in such a manner that their laminating direction A is made unidirectional. Each secondary lamellar structural region R(sub 2) is constituted of plural lamellar structural parts L formed by alternately laminating TiAl phases La and Ti(sub 3)Al phases Lb. The lamellar structural parts L are arranged in such a manner that the laminating direction A of both phases La and Lb is made irregular in the secondary lamellar structural regions R(sub 2). By the cooperation of the primary and secondary lamellar structural regions R(sub 1) and R(sub 2), the improvement of the cold strength and fracture toughness of the TiAl intermetallic compound can be attained. COPYRIGHT: (C)1994,JPO&Japio

Claims

(JP06049570)

Claims machine translated from Japanese
1. Metallographic structure plural 1st stratified organizational territories (R
[1]) With the plural 2nd stratified organizational territories (R [2]) with to possess, each
1 stratified organizational territories (R [1]) TiAl phase (La) with Ti [3]
Al phase (Lb) with, those lamination directions (A) is unidirectional
That in order to become, laminating alternately, to be constituted, each 2nd stratified organization
Territory (R [2]) TiAl phase (La) with Ti [3] Al phase (L
b) That laminating alternately, the plural stratified organizational sections which become (L)
The [ri] to be constituted, those stratified organizational sections (L), the description above 2nd stratified
The organizational territory (R [2]) in the aforementioned both phases (La and Lb) the product
In order layer direction (A) to become irregular, it is arranged
The high intensity high *** characteristic TiAl based intermetallic which is featured.
2. The aforementioned 2nd stratified organizational territory (R [2]) cubic measure amount
Ratio Vf is 0.1%<=Vf<100%, claim 1 description
High intensity high *** characteristic TiAl based intermetallic of *** .
3. The aforementioned 2nd stratified organizational territory (R [2]) cubic measure amount
Ratio Vf is 20%<=Vf, high intensity of claim 2 statement high
*** characteristic TiAl based intermetallic.
4. Metallographic structure TiAl phase (La) with Ti [3]
Al phase (Lb) with laminating alternately, the plural stratified organizations which become
The section (L) from to be constituted, those stratified organizational sections (L) the description above
Both phases (La and Lb) lamination direction (A) becomes irregular
The sea urchin to be arranged, the aforementioned stratified organizational section (L) grain size D D<=5
The high intensity high *** characteristic which features that it is set to 0 .micro.m
TiAl based intermetallic.

High strength tial intermetallic compound
JP06049567

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH0649567 **A 1994-02-22 [JP06049567]**
- **Priority Details**
  1992JP-0228038 1992-08-04

- **Fampat family**

JPH0649567	A	1994-02-22	[JP06049567]

- **Abstract:**
  (JP06049567)
  PURPOSE: To obtain a TiAl intermetallic compound in which high strength is attained by specifying its metallic structure. CONSTITUTION: The metallic structure of the TiAl intermetallic compound has plural lamellar structural regions RL. Each lamellar structural region RL is constituted of plural lamellar structural parts L formed by alternately laminating TiAl phases La and Ti(sub 3)Al phases Lb. The lamellar structural parts L are arranged in such a manner that the laminating direction A of both phases La and Lb is made irregular in the lamellar structural regions RL. Each lamellar structural region RL contributes to the improvement of the cold strength of the TiAl intermetallic compound, and the irregularity relaxes the directionality of its cold strength. COPYRIGHT: (C)1994,JPO&Japio

Claims

(JP06049567)

Claims machine translated from Japanese
1. Metallographic structure plural stratified organizational territories (R [L])
To possess, as for each stratified organizational territory (R [L]) TiAl phase (La)
With laminating with Ti [3] Al phase (Lb) alternately, the plural which becomes
From the stratified organizational section (L) to be constituted, those stratified organizational sections
(L) In the aforementioned stratified organizational territory (R [L]) the aforementioned both phases
Way (the lamination direction of La and Lb) (A) becomes irregular,
The high intensity TiAl metal which features that it is arranged
Between chemical compound.
2. Cubic measure amount ratio V of the aforementioned stratified organizational territory (R [L])
f is Vf>=0.5%, high intensity Ti of claim 1 statement
Al based intermetallic.

High ductility tial intermetallic compound
JP06049566

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO

- **International Patent Classification**
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- **Publication Information**
  JPH0649566 **A 1994-02-22 [JP06049566]**
- **Priority Details**
  1992JP-0228037 1992-08-04

- **Fampat family**

JPH0649566	A	1994-02-22	[JP06049566]

- **Abstract:**
  (JP06049566)
  PURPOSE: To obtain a TiAl intermetallic compound having excellent cold ductility by specifying its metallic structure. CONSTITUTION: The metallic structure of the Ti Al intermetallic compound has plural primary structural regions R(sub 1) and plural secondary structural regions R(sub 2). Each primary structural region R(sub 1) is constituted of at least either equi-axed crystals of TiAl or the like or the equi-axed crystals of Ti(sub 3)Al or the like. Each secondary structural region R(sub 2) is constituted of plural lamellar structural parts L formed by alternately laminating TiAl phases La and Ti(sub 3)Al phases Lb. The lamellar structural parts L are arranged in such a manner that the laminating direction A of both phases La and Lb is made irregular in the secondary structural region R(sub 2). By the cooperation of the primary and secondary structural regions R(sub 1) and R(sub 2) in this manner, the cold ductility of the TiAl intermetallic compound can be improved. COPYRIGHT: (C)1994,JPO&Japio

Claims

(JP06049566)

Claims machine translated from Japanese
1. Metallographic structure plural 1st organizational territories (R [1])
That to possess with the plural 2nd organizational territories (R [2]), each 1st organizational territory
As for limits (R [1]) axial crystal and plural Ti such as plural TiAl [3]
Axial crystal such as Al to be constituted at least from one side, each 2nd organization
As for territory (R [2]) TiAl phase (La) and Ti [3] Al phase (L
b) That laminating alternately, the plural stratified organizational sections (L) which become
The [ri] to be constituted, as for those stratified organizational sections (L), the aforementioned 2nd organization
In the territory (R [2]) the aforementioned both phases (La and Lb) lamination
In order direction (A) to become irregular, being arranged special
The high ductile TiAl based intermetallic which is made collection/symbol.
2. Cubic measure amount ratio V of the aforementioned 2nd organizational territory (R [2])
f is 0.1%<=Vf<=95%, claim 1 statement high
Ductile TiAl based intermetallic.

Tial intermetallic compound having high fatigue strength
JP05065581

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TSUNASHIMA SAKAE
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565581 **A 1993-03-19 [JP05065581]**
- **Priority Details**
  1991JP-0257260 1991-09-10

- **Fampat family**

JPH0565581	A	1993-03-19	[JP05065581]

- **Abstract:**

(JP05065581)
PURPOSE: To provide a TiAl intermetallic compd. having excellent fatigue strength. CONSTITUTION: The surface layer of a TiAl intermetallic compd. is composed of isometric crystals of <50.mu.m average diameter. The equiaxed crystals are .gamma.- and .alpha.(sub 2)-equiaxed crystals. Since the crystal structure of the surface layer is fine and the equiaxed crystals have isotropy, fracture start points appear hardly in the surface layer and the fatigue strength of the TiAl intermetallic compd. is enhanced. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065581)

Claims machine translated from Japanese

1. Surface layer axial crystal under mean diameter 50 .micro.m and the like
From to constitute, as for that and the like axial crystal I and so on the axial crystal and I [2] and so on the axial crystal
Conversion between the high fatigue strength TiAl metal which feature that it becomes the [ri]
Combination ones.

2. The description above I [2] and so on cubic measure amount ratio Vf of axial crystal 2%<=
It set to Vf<=20%, high fatigue strength T of claim 1 statement
iAl based intermetallic.

High strength and high ductility tial inter-metallic compound
JP05065580

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE

- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18
- **Publication Information**
  JPH0565580 **A 1993-03-19 [JP05065580]**
- **Priority Details**
  1991JP-0257258 1991-09-10

- **Fampat family**

JPH0565580	A	1993-03-19	[JP05065580]

- **Abstract:**
  (JP05065580)
  PURPOSE: To provide a high strength and high ductility TiAl intermetallic compd. CONSTITUTION: This TiAl intermetallic compd. has metal texture consisting of lamellar structure L formed Z alternately laminating .alpha.(sub 2)-phase p1 and .gamma.-phase p2, and .gamma.-equiaxed crystals (c). The volume fraction Vf of the .gamma.-equiaxed crystals (c) is 3-90%. Aggregates G of pieces of the lamellar structure L have been dispersed in at least part of the metal texture. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065580)

1. Metallographic structure, I [2] phase and I phase alternately
The TiAl metal which consists of with stratified organization and I and so on the axial crystal which it laminates
In between chemical compound, I and so on cubic measure amount ratio Vf of the axial crystal 3%<=V
To set to f<=90%, at least in portion of the aforementioned metallographic structure
It features that the aggregate of the aforementioned stratified organization is made to disperse high
Strength high ductile TiAl based intermetallic.

High toughness tial intermetallic compound
JP05065573

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUNASHIMA SAKAE
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-014/00 C22F-001/18

- **Publication Information**
  JPH0565573 **A 1993-03-19 [JP05065573]**
- **Priority Details**
  1991JP-0230637 1991-09-10

- **Fampat family**

JPH0565573	A	1993-03-19	[JP05065573]

- **Abstract:**
  (JP05065573)
  PURPOSE: To provide a high toughness TiAl intermetallic compd. CONSTITUTION: This TiAl intermetallic compd. has lamellar structure L formed by alternately laminating .alpha.(sub 2)-phase p1 and .gamma.-phase p2, and mixed crystal structure C consisting of .alpha.(sub 2)-equiaxed crystals c(sub 1) and .gamma.-equiaxed crystals c(sub 2). The volume fraction Vf1 of the .alpha.(sub 2)-phase p1 in the lamellar structure L and the volume fraction Vf2 of the .alpha.(sub 2)-equiaxed crystals c(sub 1) in the mixed crystal structure C satisfy relations represented by inequalities, 0.05%<+Vf1+Vf2<50% and 0.6Vf2<+Vf1. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065573)

1. Stratified I [2] phase and I phase are laminated alternately
Organization and, I [2] and so on the axial crystal and I and so on the mixed crystal organization which consists of the axial crystal
It is while the possessing and the aforementioned stratified organization, cubic measure amount ratio of I [2] phase Vf1
It does, in addition it is in the midst of the aforementioned mixed crystal organizing, I [2] and so on cubic measure amount ratio of the axial crystal Vf
When making 2,
0. 05%<=Vf1+Vf2<50%, and 0.6V
The high
characteristic TiAl system which features that it is formed the relationship of f2<=Vf1
Intermetallic.

Production of structural member made of high strength tial intermetallic compound

JP05065562

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TSUNASHIMA SAKAE
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-001/04 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565562 A 1993-03-19 [JP05065562]
- **Priority Details**
  1991JP-0230638 1991-09-10

- **Fampat family**

JPH0565562	A	1993-03-19	[JP05065562]

- **Abstract:**
  (JP05065562)
  PURPOSE: To obtain a structural member made of a high strength TiAl intermetallic compd. having isotropic mechanical characteristics by depositing isometric crystals having anisotropy at random in orientation. CONSTITUTION: A green compact is formed with powdery starting material contg. first Ti-Al powder for an intermetallic compd. whose crystal structure is .gamma.-single phase structure and second Ti-Al powder for an intermetallic compd. whose crystal structure is .alpha.(sub 2)-single phase structure. The green compact is then subjected to hot isostatic pressing to obtain a structural member made of a TiAl intermetallic compd. having metal texture consisting of .gamma.-isometric crystals c(sub 1) and .alpha.(sub 2)-isometric crystals c(sub 2) and having no dependency on orientation. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065562)

Claims machine translated from Japanese
1. Chemical combination between the metal where crystalline structure is I single-phase structure
Thing make 1Ti-Al powder and crystalline structure with I [2] single-phase structure
The raw materials which possess with a certain intermetallic make 2Ti-Al powder
To produce the material making use of the powder, next in the aforementioned material calcination processing
Administering, and so on it consists of the axial crystal, at the same time does not have the direction dependancy
It features that the structural element which has metallographic structure is obtained high it is strong
Production method of degree TiAl based intermetallic make structural element.
2. The 2Ti-Al powder in the raw materials powder
40 weight % of combination quantity is set below, claim 1 statement high
Production method of strength TiAl based intermetallic make structural element.
3. Crystalline structure I phase and I [2] phase random
To be quarter-phase structure which arranges, at the same time cubic measure amount ratio Vf of I [2] phase
The intermetallic make 1Ti-A which is set 30% or less
The intermetallic where the l powder and crystalline structure are I [2] single-phase structure
Make making use of the raw materials powder which possesses with the 2Ti-Al powder the material
To produce, administering calcination processing to the aforementioned material next, and so on, the axial crystal
It consisted of, it had the metallographic structure which at the same time does not have the direction dependancy
The high intensity TiAl metal which features that the structural element is obtained
Production method of between chemical compound make structural element.
4. In the raw materials powder, the gross of I [2] phase 40
Weight % It sets below, high intensity TiAl of claim 3 statement
Production method of type intermetallic make structural element.

Production of high strength tial intermetallic compound
JP05065559

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-001/04

- **Publication Information**
  JPH0565559 **A 1993-03-19 [JP05065559]**
- **Priority Details**
  1991JP-0257259 1991-09-10

- **Fampat family**

JPH0565559	A	1993-03-19	[JP05065559]

- **Abstract:**
  (JP05065559)
  PURPOSE: To obtain a high strength TiAl intermetallic compd. having uniformity in grain size by subjecting starting material to cold isostatic pressing (CIP) and hot isostatic pressing (HIP). CONSTITUTION: Stock is formed by CIP with powdery starting material consisting of Ti powder, Al powder and Mn powder and this stock is subjected to HIP to obtain a TiAl intermetallic compd. The Mn powder has function to lower the m.p. of the Ti powder by a eutectic reaction with the Ti powder, heat is satisfactorily propagated to each particle of the Ti powder at the sintering temp. and the TiAl intermetallic compd. can be made uniform in grain size. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065559)

1. Ti powder and Al powder and Ti and A
At least one side of the l powder and the powder of the element which causes the eutectoid reaction
To form the material with making use of the raw materials powder which consists of, next the description above
High intensity TiAl it features that calcination treatment is administered to the material
Production method of type intermetallic.
2. As for the powder of the element which causes the aforementioned eutectoid reaction, M
It is selected from the n powder, the Si powder and the Ge powder little
Also to be kind, the addition quantity of that powder 0.05 atmoic % from here
On, 5 atmoic % it is set below, high intensity of claim 1 statement
Production method of TiAl based intermetallic.

High strength tial alloy
JP05065579

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-001/00 C22C-001/10 C22C-014/00 C22C-029/02 C22C-029/06 C22C-029/18 C22C-032/00

- **Publication Information**
  JPH0565579 **A 1993-03-19 [JP05065579]**
- **Priority Details**
  1991JP-0256969 1991-09-09

- **Fampat family**

JPH0565579	A	1993-03-19	[JP05065579]

- **Abstract:**
  (JP05065579)
  PURPOSE: To obtain a high strength TiAl alloy by incorporating a specified amt. of particles of a compd. contg. Ge, C or Si. CONSTITUTION: This TiAl alloy contains 0.01-15vol.% particles of a compd. contg. at least one or more among Ge, C and Si and has high strength. The particles are dispersed as deposited phase in this TiAl alloy. In the case of <0.01vol.% of the particles, high strength is not obtd. In the case of >15vol.%, strength is reduced on the contrary. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065579)

1. Ge, C, among Si at least above kind
The chemical compound grain which includes the element vis-a-vis the whole alloy the 0.01-1
5 volume % the high intensity TiAl combination which features that it contains
Gold.

High toughness tial alloy
JP05065578

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565578 **A 1993-03-19 [JP05065578]**
- **Priority Details**
  1991JP-0256968 1991-09-09

- **Fampat family**

JPH0565578	A	1993-03-19	[JP05065578]

- **Abstract:**
  (JP05065578)
  PURPOSE: To obtain a high toughness TiAl alloy. CONSTITUTION: This high toughness TiAl alloy has lamellar structure, in which the ratio of the width of .alpha.(sub 2)-phase to that of .gamma.-phase is 0.01-0.55. The volume of the .alpha.(sub 2)-phase in the lamellar structure is 0.05-32% of that of the structure. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065578)

1. The TiAl based alloy smell of possessing lamella organization
It is in the [te] and the aforementioned lamella organization, width of I phase something related to width of I [2] phase
Value (of width of width/.gamma. phase of I [2] phase) 0.01 or more,
0.55 It is below, at the same time is while the aforementioned lamella organizing I [2] phase
Cubic measure ratio 0.05% from here vis-a-vis the cubic measure of the aforementioned lamella organization
The high characteristic TiAl which features that on and it is 32% or less
Type alloy.
2. In high characteristic TiAl based alloy of claim 1 statement
Being, cubic measure ratio of lamella organization vis-a-vis alloy the whole description above 30
% The high characteristic TiAl based alloy which features that it is above.

High ductility tial alloy
JP05065577

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565577 **A 1993-03-19 [JP05065577]**
- **Priority Details**
  1991JP-0256967 1991-09-09

- **Fampat family**

JPH0565577	A	1993-03-19	[JP05065577]

- **Abstract:**
  (JP05065577)
  PURPOSE: To obtain a high ductility TiAl alloy. CONSTITUTION: This high ductility Till alloy has lamellar structure. The total width of a piece of .gamma.-phase and a piece of .alpha.(sub 2)-phase adjacent to each other in the lamellar structure is 0.01-30.mu.m and the volume of the .alpha.(sub 2)-phase in the structure is 0.05-40% of that of the structure. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065577)

Claims machine translated from Japanese

1. The TiAl based alloy smell of possessing lamella organization

Width of one I phase which it adjoins in inside the [te] and the aforementioned lamella organization

With total of width of one I [2] phase 0.01 .micro.m or more, 30.micro.

It is m, or less at the same time is while the aforementioned lamella organizing cubic measure ratio of I [2] phase

Vis-a-vis the cubic measure of the aforementioned lamella organization 0.05% or more, 40

% The high ductile TiAl based alloy which features that it is below.

2. In high ductile TiAl based alloy of claim 1 statement

Being, cubic measure ratio of lamella organization vis-a-vis alloy the whole description above 30

% The high ductile TiAl based alloy which features that it is above.

High strength tial intermetallic compound
JP05065571

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TSUNASHIMA SAKAE
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565571 **A 1993-03-19 [JP05065571]**
- **Priority Details**
  1991JP-0227728 1991-09-09

- **Fampat family**

JPH0565571	A	1993-03-19	[JP05065571]

- **Abstract:**
  (JP05065571)
  PURPOSE: To provide a high strength TiAl intermetallic compd. CONSTITUTION: The compsn. of a base part 1 is composed of 46-50 atomic % Al and the balance Ti. The compsn. of a surface layer part 2 integrated with the base part 1 is composed of 42-48 atomic % Al and the balance Ti and the Ti content of the surface layer part 2 is made higher than that of the base part 1. Since the base part 1 has a higher Al content than the surface layer part 2, satisfactory ductility is exhibited. Since the surface layer part 2 has a higher Ti content than the base part 1, satisfactory strength at ordinary temp. is exhibited. Thus, the objective TiAl intermetallic compd. having enhanced strength as a whole can be provided. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065571)

Claims machine translated from Japanese
1. Constitution of active section 46 atmoic % <=Al<=50
Atmoic % And to be remainder Ti, the aforementioned active section and the surface of one body
Constitution of section 42 atmoic % <=Al<=48 atmoic % and remainder T
To be i, at the same time Ti content Ti content of the aforementioned active section
In order also for the [ri] to become many, it features that it is set high
Strength TiAl based intermetallic.

High toughness and high ductility tial inter-metallic compound
JP05065570

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUNASHIMA SAKAE
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565570 A 1993-03-19 [JP05065570]
- **Priority Details**
  1991JP-0227727 1991-09-09

- **Fampat family**

JPH0565570	A	1993-03-19	[JP05065570]

- **Abstract:**
  (JP05065570)
  PURPOSE: To provide a high toughness and high ductility TiAl intermetallic compd. CONSTITUTION: The metal texture of a TiAl intermetallic compd. is made of an aggregate of pieces of lamellar structure L formed by alternately laminating Ti(sub 3)Al phase p1 and TiAl phase p2. When the width of each piece of the lamellar structure L in the laminating direction is represented by (a) and the width in a direction perpendicular to the laminating direction is represented by (b), the aspect ratio (a/b) is regulated to 0.2-1.3. The bending rupture strain of the TiAl intermetallic compd. can be improved. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065570)

Claims machine translated from Japanese
1. At least part Ti [3] Al phase and TiA
To be constituted from the stratified organization which laminates with l phase alternately, the layer of that
At the time of condition organizing, Ti [3] Al phase and TiAl phase lamination
Width of the direction which designates the width of direction as a, in addition the lamination direction crosses
When making b, aspect ratio a/b 0.2<=a/b
The high *** ductility TiAl which features that it sets to the <=1.3
Type intermetallic.
2. Cubic measure amount ratio Vf of the aforementioned stratified organization, 10%
It is <=Vf<=100%, high *** ductility Ti of claim 1 statement
Al based intermetallic.
3. Ti in the aforementioned stratified organizing [3] the body of Al phase
Integral calculus ratio Vf, is 0.5%<=Vf<=50%, the claim
High *** ductile TiAl based intermetallic of 1 or 2 statements.

High toughness tial intermetallic compound
JP05065569

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI

- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565569 **A 1993-03-19 [JP05065569]**
- **Priority Details**
  1991JP-0227726 1991-09-09

- **Fampat family**

JPH0565569	A	1993-03-19	[JP05065569]

- **Abstract:**
  (JP05065569)
  PURPOSE: To provide a TiAl intermetallic compd. having excellent toughness. CONSTITUTION: This TiAl intermetallic compd. has lamellar structure L formed by alternately laminating Ti(sub 3)Al phase p1 and TiAl phase p2. The volume fraction Vf of the Ti(sub 3)Al phase p1 in the structure L is set 0.05-40%. When the Ti(sub 3)Al phase p1 and the TiAl phase p2 adjacent to each other is regarded as a laminated unit U, the average width (w) of such laminated units U in the laminating direction is set 0.01-30.mu.m. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065569)

Claims machine translated from Japanese
1. Ti [3] Al phase (p1) and TiAl phase (p
2) With to possess the stratified organization (L) which is laminated alternately, the layer of that
Cubic measure amount ratio Vf of Ti [3] Al phase (p1) in the midst of condition organization (L)
Ti which it sets to 0.05%<=Vf<=40%, in addition phase is placed next
[3] Al phase (p1) and TiAl phase (p2) lamination [yunitsu]
When making [to] (U), Ti [3] Al phase (p1) and TiAl
The aforementioned lamination unit in the lamination direction of phase (p2)
(U) Setting average width w to 0.01 .micro.m<=w<=30 .micro.m
The high *** characteristic TiAl based intermetallic which features that it does.
2. Cubic measure amount ratio Vf of the aforementioned stratified organization (L) 3
It set to 0%<=Vf<=100%, claim 1 statement high ***
Characteristic TiAl based intermetallic.

Production of high strength and high ductility tial intermetallic compound
JP05065560

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-001/04 C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565560 **A 1993-03-19 [JP05065560]**
- **Priority Details**
  1991JP-0227724 1991-09-09

- **Fampat family**

JPH0565560	A	1993-03-19	[JP05065560]

- **Abstract:**
  (JP05065560)
  PURPOSE: To obtain a high strength and high ductility TiAl intermetallic compd. by using two kinds of powdery starting materials having mutually different characteristics. CONSTITUTION: First. powder having a compsn. consisting of 42-47 atomic% Al and the balance Ti is mixed with second powder having a compsn. consisting of 46-49 atomic% Al and the balance Ti and having a lower Ti content than the first powder to prepare powdery starting material contg. 20-70wt.% of the first powder. A green compact is formed by cold isostatic pressing with the starting material and subjected to hot isostatic pressing to obtain a TiAl intermetallic compd. made of a sintered body. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065560)

Claims machine translated from Japanese
1. Constitution 42 atmoic % <=Al<=47 atmoic %
Are calling remainder Ti the 1st powder and the constitution which 46 atmoic % <=A
To be l<=49 atmoic % and remainder Ti, at the same time Ti content
It was set fewer than Ti contents of the aforementioned 1st powder
As it possesses with 2 powders, the combination quantity of aforementioned 1st powder 20 it is heavy
The quantitative %<= 1st powder <=70 weight % from the raw materials powder which is set
The material forming, next administering calcination processing to that material
Production of the high intensity high ductile TiAl based intermetallic which is made feature
Method.

Production of tial intermetallic compound having high creep strength
JP05065561

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-001/04 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565561 **A 1993-03-19 [JP05065561]**
- **Priority Details**
  1991JP-0227729 1991-09-09

- **Fampat family**

JPH0565561	A	1993-03-19	[JP05065561]

- **Abstract:**
  (JP05065561)
  PURPOSE: To obtain a TiAl intermetallic compd. having enhanced creep strength as well as an upward tendency in strength at ordinary temp. CONSTITUTION: Stock having 0.1-0.5 atomic Ge content and lamellar structure L formed by alternately laminating TiAl phase p1 and TiAl phase p2 is produced and heat-treated to increase the average width (W(sub 1)) of the TiAl phase-p2 in the laminating direction while inhibiting the increase of the average grain diameter (d) of the lamellar structure L. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065561)

Claims machine translated from Japanese
1. Ti [3] Al phase and TiAl phase alternately product
To possess the stratified organization which layer is done, at the same time 0.1 atmoic % of Ge content
<=Ge<=0.5 atmoic % it produces the material which is set, the next is
So administering heat treatment to the aforementioned material, mean diameter of the aforementioned stratified organization
While controlling increase, the product of Ti [3] Al phase and TiAl phase
Average width of the TiAl phase in layer direction, the description above of the aforementioned material
The high creeping strength which features that average width compared to it expands
Production method of the TiAl based intermetallic which it possesses.

High toughness and high ductility tial intermetallic compound
JP05065576

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565576 **A 1993-03-19 [JP05065576]**
- **Priority Details**
  1991JP-0250282 1991-09-04

- **Fampat family**

JPH0565576	A	1993-03-19	[JP05065576]

- **Abstract:**
  (JP05065576)
  PURPOSE: To obtain a high toughness and high ductility TiAl intermetallic compd. by specifying the volume fraction of pro-eutectoid TiAl phase in the metal texture of a TiAl intermetallic compd. composed of heat-treated TiAl phase and the pro-eutectoid TiAl phase. CONSTITUTION: The metal texture of a TiAl intermetallic compd. is composed of matrix phase having heat-treated TiAl phase .gamma. and Ti(sub 3)Al phase and pro - eutectoid TiAl phase .gamma.' dispersed in the matrix phase and the volume fraction of the pro-eutectoid TiAl phase .gamma.' is regulated to <+40%. Thus, the toughness and ductility of the TiAl intermetallic compd. can be enhanced. The pro- eutectoid TiAl phase .gamma.' deposits during cooling from a molten state, has a higher Al concn. than the heat-treated TiAl phase .gamma., is brittle owing to the higher Al concn. and adversely affects the toughness and ductility of the TiAl intermetallic compd. When the volume fraction of the phase .gamma.' exceeds 40%, the toughness and ductility of the TiAl intermetallic compd. deteriorate. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065576)

1. Metallographic structure, heat treatment TiAl phase I pro-eutectoid
TiAl phase I ' with from the TiAl based intermetallic which is formed
So being, the aforementioned pro-eutectoid TiAl phase I ' cubic measure amount ratio Vf 4
The high ductility TiAl which features that it sets 0% or less
Type intermetallic.
2. Metallographic structure, matrix phase M and the [ma]
The pro-eutectoid TiAl phase I which is dispersed to [toritsukusu] phase M ' with from structure
As for forming and the aforementioned matrix phase M heat treatment TiAl phase I
With the TiAl based intermetallic which possesses [bi] Ti [3] Al phase I [2]
Being, the pro-eutectoid TiAl phase I in metallographic structure the whole description above '
To set cubic measure amount ratio Vf 40% or less, in addition aforementioned [matori]
Cubic measure amount ratio Vf of the Ti [3] Al phase I in [tsukusu] phase M [2]
The high ductility TiA which features that it sets 50% or less
l based intermetallic.

Structural member made of tial intermetallic compound
JP05065575

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565575 **A 1993-03-19 [JP05065575]**
- **Priority Details**
  1991JP-0250281 1991-09-04

- **Fampat family**

JPH0565575	A	1993-03-19	[JP05065575]

- **Abstract:**

(JP05065575)
PURPOSE: To provide a structural member made of a high strength and high toughness TiAl intermetallic compd. CONSTITUTION: This structural member 1 used under prescribed stress is made of a TiAl intermetallic compd. having a lamellar structure L formed by alternately laminating Ti(sub 3)Al phase .alpha.(sub 2) and TiAl phase .gamma.. The volume fraction Vf of the lamellar structure L is set 100% and the angle .theta. of inclination of a laminating direction line (b) to a line (a) of stress in the structure L is 90 deg. when the stress direction (a) is defined to be parallel to the stress direction in the lamellar structure L and when the laminating direction line (b) is defined to be parallel to the alternately laminating direction of the Ti(sub 3)Al phase .alpha.(sub 2) and the TiAl phase .gamma.. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065575)

1. Ti [3] Al phase (I [2]) and TiAl phase
(I) Ti which possesses the stratified organization (L) which is laminated alternately
Is formed being the structural element which from the Al based intermetallic,
As for the aforementioned stratified organization (L) plural stratified histodifferentiation departments (La)
The [ri] is constituted, in all the stratified histodifferentiation departments (La) Ti [3] which
Al phase I [2] setting the lamination direction of TiAl phase I unidirectionally
The TiAl based intermetallic make structure division which features that it does
Material.
2. TiAl phase (I [2]) and TiAl phase (I)
With the TiAl system which possesses the stratified organization (L) which is laminated alternately
To be constituted from the intermetallic, at the same time under specified stress use
Being the [re] [ru] structural element, cubic measure amount ratio of the aforementioned stratified organization (L)
Vf to be 30%<=Vf<=100%, the aforementioned stratified organization
(L) Parallel with the stress direction in stress directional traverse (a) correcting/rule
Fixed to do, in addition Ti [3] Al phase (I [2]) and TiAl phase (I)
When stipulating the lamination directional traverse (b) parallel with lamination direction,
The aforementioned lamination directional traverse (b) for the aforementioned stress directional traverse (a)
It features that tilted angle I is 45.deg.<=.theta.<=90.deg.
TiAl based intermetallic make structural element.
3. As for the aforementioned TiAl based intermetallic, Ti
Combining, by forming the Ti [5] M [3] type deposit the description above
Ti [3] Al phase (I [2]) and TiA in stratified organization (L)
The 3rd element which arranges the lamination direction of l phase (I) unidirectionally
(M) To contain, as for content of that 3rd element (M) 0.0
5 atmoic % <=M<=0.5 atmoic % is, claim 1 or 2
TiAl based intermetallic make structural element of statement.
4. Ti [3] in the aforementioned stratified organization (L) Al
Of phase (I [2]) cubic measure amount ratio Vf is Vf<=80%, claim
Section TiAl based intermetallic make structure of 1,2 or 3 statements
Component.

High toughness and high ductility tial intermetallic compound
JP05065574

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-001/04 C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565574 **A 1993-03-19 [JP05065574]**
- **Priority Details**
  1991JP-0250280 1991-09-04

- **Fampat family**

JPH0565574	A	1993-03-19	[JP05065574]

- **Abstract:**
  (JP05065574)
  PURPOSE: To provide a TiAl intermetallic compd. having excellent toughness and ductility. CONSTITUTION: The metal texture of this TiAl intermetallic compd. is composed of a group of parts L having a lamellar structure formed by alternately depositing platy TiAl phase .gamma. and platy Ti(sub 3)Al phase .alpha.(sub 2), TiAl phase .gamma.' forming a group of equiaxed crystals and existing among the parts L and amorphous Ti(sub 3)Al phase .alpha.(sub 2)' filling the gap among the equiaxed crystals. The parts L have satisfactory toughness and ductility owing to their own laminated structure. The brittleness of this TiAl intermetallic compd. due to the TiAl phase .gamma.' can be compensated by regulating the volume fraction Vf of the amorphous Ti(sub 3)Al phase .alpha.(sub 2)' to 0.5-50%. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065574)

1. Axial crystal TiAl phase I of one group and the like ' with, those
And so on axial crystal TiAl phase I ' the uncertain shape Ti [3] Al phase I which buries between [2] ' With to possess, the uncertain shape Ti [3] Al phase I [2] ' cubic measure amount
Ratio Vf 0.5% or more and setting 50% or less special
The high ductile TiAl based intermetallic which is made collection/symbol.

Oxidation resistant tial intermetallic compound material and production of it
JP05059464

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-001/00

- **Publication Information**
  JPH0559464 **A 1993-03-09 [JP05059464]**
- **Priority Details**
  1991JP-0242362 1991-08-29

- **Fampat family**

JPH0559464	A	1993-03-09	[JP05059464]

- **Abstract:**
  (JP05059464)
  PURPOSE: To provide a TiAl intermetallic compd. material having excellent oxidation resistance at high temp. CONSTITUTION: A middle layer 2 of Al(sub 2)Ti as an intermetallic compd. is formed on a substrate 1 of TiAl as an intermetallic compd. so that the layer 2 is integrated with the substrate 1 and a surface layer 3 of (Al, Ge)(sub 3)Ti as an intermetallic compd. is formed on the middle layer 2 so that the layer 3 is integrated with the layer 2. The surface layer 3 is very dense and has function to prevent the penetration and diffusion of oxygen from the outside. The middle layer 2 has function to prevent the oxidation of the substrate 1. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05059464)

1. The subject which consists of the TiAl based intermetallic
(1) With, (Al and Ge) [3] from Ti based intermetallic
The [ri], at the same time the aforementioned subject (1) with the surface of one body (3) with having
The oxidation resistance TiAl based intermetallic which features that it is
Material.
2. The subject which consists of the TiAl based intermetallic
(1) With, from the TiAl based intermetallic whose Al density is high
To become, at the same time the aforementioned subject (1) with center of one body (2) with,
(Al and Ge) [3] to consist of the Ti based intermetallic, at the same time before
Description center (2) with the surface of one body (3) with have
The oxidation resistance TiAl based intermetallic material which is featured.
3. 25 atmoic % above, 75 atmoic % Al below
It contains, the TiAl based intermetallic group where the remainder is Ti
Component and 0.01 atmoic % above, 1 atmoic % Ge below
To produce the intermediate material which it contains, next in the aforementioned intermediate material heat treatment
Administering, (Al and Ge) [3] it consists of the Ti based intermetallic
The oxidation resistance TiAl gold which features that the surface is formed
Production method of intergeneric chemical compound material.

High toughness and high ductility tial intermetallic compound
JP05059476

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-021/00

- **Publication Information**
  JPH0559476 **A 1993-03-09 [JP05059476]**
- **Priority Details**
  1991JP-0240251 1991-08-28

- **Fampat family**

JPH0559476	A	1993-03-09	[JP05059476]

- **Abstract:**
  (JP05059476)
  PURPOSE: To provide a TiAl intermetallic compd. having excellent toughness and ductility. CONSTITUTION: This TiAl intermetallic compd. is made of Ll(sub 2) phase A obtd. by incorporating Mn into Al(sub 3)Ti phase. The Ll(sub 2) phase A has double-phase structure having matrix forming regions a(sub 1) and a network forming region a(sub 2) having a higher Mn concn. than the regions a(sub 1). COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05059476)

1. Al [3] in Ti phase, from Cr and Mn selection
L1 which at least makes a kind of 3rd element contain [2]
To be constituted from phase, the L1 [2] as for phase, density of the 3rd element uncommonness
The high ductility T which possessing the plural constitution limits which are done feature is done
iAl based intermetallic.
2. 60 atmoic % above, 67 atmoic % Al below
And 8 atmoic % above, 15 atmoic % containing the 3rd element below
It does, the remainder is Ti, high ductility TiA of claim 1 statement
l based intermetallic.

High toughness and high ductility tial intermetallic compound
JP05059469

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH0559469 **A 1993-03-09 [JP05059469]**
- **Priority Details**
  1991JP-0240250 1991-08-28

- **Fampat family**

JPH0559469	A	1993-03-09	[JP05059469]

- **Abstract:**
  (JP05059469)
  PURPOSE: To enhance toughness and ductility at ordinary temp. and high temp. by adding a prescribed amt. of Ge to a TiAl intermetallic compd. and specifying the unit lattice volume of isometric crystals of the compd. CONSTITUTION: A TiAl intermetallic compd. having a prescribed compsn. contg. 0.01-0.5 atomic % Ge is melted and cast. The resulting ingot is made of a TiAl intermetallic compd. composed of isometric crystals having <65.2Angstroms(sup 3) unit lattice volume and this TiAl intermetallic compd. has excellent toughness and ductility. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05059469)

1. And so on between the TiAl metal which from the axial crystal are formed
In chemical compound, unit lattice cubic measure of the axial crystal such as the description above 65.2
0 (3) the high ductility TiA which features that it sets under
l based intermetallic.
2. In TiAl based intermetallic constitution amount, 0.

01 atmoic % above, 0.50 atmoic % Ge below is added,
It is, the high ductile TiAl based intermetallic of claim 1 statement.

High strength tial intermetallic compound
JP05051681

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0551681 **A 1993-03-02 [JP05051681]**
- **Priority Details**
  1991JP-0215555 1991-08-27

- **Fampat family**

JPH0551681	A	1993-03-02	[JP05051681]

- **Abstract:**

(JP05051681)
PURPOSE: To improve strength by incorporating a TiAl intermetallic compound composition containing specific proportion of Al and specific amounts of oxygen and constituting a metallic structure of TiAl phases and Ti(sub 3)Al phases of specific volume fraction. CONSTITUTION: This TiAl intermetallic compound contains a TiAl intermetallic compound composition consisting of 36-60 atomic % Al and the balance Ti and 0.01-1wt.% oxygen and has a metallic structure which is composed of a dual-phase structure of TiAl phases (.gamma.) and Ti(sub 3)Al phases .alpha.(sub 2) and where the volume fraction Vf of the phases .alpha.(sub 2) is set at 1-80% and this intermetallic compound has high strength. As to oxygen content, the strength improving effect is decreased when it is below the lower limit, and, when it exceeds the upper limit, the amount of oxygen in the form of solid solution in the phases (.gamma.) is increased and the ductility of the above intermetallic compound at ordinary temp. is deteriorated. Further, when the volume fraction Vf of the phases .alpha.(sub 2) is below the lower limit, the effects of improving strength and ductility at ordinary temp. are decreased because oxygen is not preferentially allowed to enter into solid solution, and, on the other hand, when it exceeds the upper limit the characteristics of the phases (.gamma.), that is, light weight and high specific strength are deteriorated and the ductility of the above intermetallic compound at orfinary temp. is deteriorated.

Claims

(JP05051681)

Claims machine translated from Japanese
1. 36 atmoic % above, 60 atmoic % Al below
It contains, the TiAl based intermetallic group where the remainder is Ti
Component and 0.01 weight % above, 1 weight % oxygen below
To contain, metallographic structure, TiAl phase I and Ti [3] Al phase
I [To consist of quarter-phase organization which possesses 2], Ti [3] Al phase I [the body of 2]
Integral calculus ratio Vf 1% or more and setting 80% or less special
The high intensity TiAl based intermetallic which is made collection/symbol.

Tial intermetallic compound having high strength, high toughness, and high ductility

JP05051680

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TSUNASHIMA SAKAE
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH0551680 A 1993-03-02 [JP05051680]
- **Priority Details**
  1991JP-0215556 1991-08-27

- **Fampat family**

JPH0551680	A	1993-03-02	[JP05051680]

- **Abstract:**
  (JP05051680)
  PURPOSE: To improve strength, toughness, and ductility by specifying the average crystalline grain size and the amount of contained oxygen in a TiAl intermetallic compound, respectively. CONSTITUTION: This TiAl intermetallic compound has a composition consisting of 36-60 atomic % Al and the balance Ti and also has <+50.mu. average crystalline grain size and <+1.0wt.% contained oxygen content. When the average grain size exceeds 50.mu., the regularity of crystal orientation is increased and, as a results, transgranular cleavage is allowed to occur and the strength, toughness, and ductility of the above intermetallic compound are deteriorated. Further, when the amount of contained oxygen exceeds 1.0wt.%, the toughness and ductility of the above intermetallic compound are deteriorated similarly. Because this intermetallic compound is obtained by regulating the amount of oxygen contained in powdery raw materials at the time of preparing these powdery raw materials and also regulating the crystalline grain size by means of heat treatment, the refining of crystalline grains and the reduction in the amount of contained oxygen can be relatively easily attained. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05051680)

1. Average crystal grain size to be 50 .micro.m or less, containing
The possession oxygen quantity 1.0 weight % features that it is below, high
Strength high *** ductile TiAl based intermetallic.

Tial intermetallic compound having high toughness and ductility
JP05051679

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH0551679 **A 1993-03-02 [JP05051679]**
- **Priority Details**
  1991JP-0208188 1991-08-20

- **Fampat family**

JPH0551679	A	1993-03-02	[JP05051679]

- **Abstract:**
  (JP05051679)
  PURPOSE: To obtain the intermetallic compound by adding specific amounts of In to the composition of a TiAl intermetallic compound containing specific proportion of Al. CONSTITUTION: This TiAl intermetallic compound is prepared by adding 0.05-3 atomic % In to the composition of a TiAl intermetallic compound consisting of 30-60 atomic % Al and the balance Ti and has superior ductility at ordinary temp. and toughness. When In contents is lower than 0.05 atomic % or exceeds 3 atomic %, the bending strength and bending elongation of the above intermetallic compound are deteriorated. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05051679)

1. 30 atmoic % above, 60 atmoic % Al below
It contains, the TiAl based intermetallic group where the remainder is Ti
In component, 0.05 atmoic % above, 3 atmoic % In below attachment
Adding chemical combination between the high *** ductile TiAl metal which feature that it does
Thing.

Tial intermetallic compound having high toughness and ductility
JP05051678

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH0551678 **A 1993-03-02 [JP05051678]**
- **Priority Details**
  1991JP-0208187 1991-08-20

- **Fampat family**

JPH0551678	A	1993-03-02	[JP05051678]

- **Abstract:**
  (JP05051678)
  PURPOSE: To obtain the intermetallic compound by adding specific amounts of Ga to a TiAl intermetallic compound composition containing specific proportion of Al, specifying the volume fraction of Ti(sub 3)Al phases, and improving a metallic structure. CONSTITUTION: This TiAl intermetallic compound contains a TiAl intermetallic compound composition consisting of 30-60 atomic % Al and the balance Ti and 0.05-<5 atomic % Ga, and further, the volume fraction Vf of Ti(sub 3)Al phases .alpha.(sub 2) is set at 0.05-40% and superior ductility at ordinary temp. and also superior toughness are provided in this intermetallic compound. As to the volume fraction Vf of the phases .alpha.(sub 2), the metallic structure is coarsened and strength and ductility at ordinary temp. are deteriorated when it is below the lower limit, and, on the other hand, the metallic structure is embrittled and strength and ductility at ordinary temp. are deteriorated when it exceeds the upper limit. When Ga content is below the lower limit there is no difference in effect as compared with the case free from Ga addition, and, when it exceeds the upper limit, the cleavage strength of TiAl phases (.gamma.) is deteriorated and the bending strength and bending elongation of the above intermetallic compound are deteriorated. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05051678)

1. 30 atmoic % above, 60 atmoic % Al below
It contains, the TiAl based intermetallic group where the remainder is Ti
Component and 0.05 atmoic % above, 5 atmoic % Ga under containing
Possessing and Ti [3] Al phase I [cubic measure amount ratio Vf of 2] 0.05% from here
The high *** ductility T which features that on and it sets 40% or less
iAl based intermetallic.

Tial intermetallic compound having high toughness and ductility
JP05051677

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  YAGI KAZUHIKO
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH0551677 A 1993-03-02 [JP05051677]
- **Priority Details**
  1991JP-0208186 1991-08-20

- **Fampat family**

JPH0551677	A	1993-03-02	[JP05051677]

- **Abstract:**
  (JP05051677)
  PURPOSE: To obtain the intermetallic compound by adding specific amounts of Ge to a TiAl intermetallic compound composition containing Ti and Al. CONSTITUTION: This TiAl intermetallic compound is prepared by adding 0.05-2.0 atomic % Ge to a TiAl intermetallic compound composition containing, preferably, 35-60 atomic % Al and has superior ductility at ordinary temp. and toughness. Ge has a function of changing the amount of precipitation of Ti(sub 3)Al phases .alpha.(sub 2) and controls the volume fraction of the phases .alpha.(sub 2) to the value in the prescribed range to improve the ductility at ordinary temp. and toughness of the above intermetallic compound. Further, Ge has functions of adjusting the interfaces between TiAl phases (.gamma.) and the phases .alpha.(sub 2) and reducing the lattice constant of the phases (.gamma.) and improves the ductility of the above intermetallic compound at ordinary temp. Moreover, Ge has a function of precipitating Ge compounds and improves the strength of the above intermetallic compound. As to the additive quantity of Ge, the precipitation of the phases .alpha.(sub 2) and the Ge compounds becomes insufficient when it is below the lower limit, and, when it exceeds the upper limit, the amount of precipitation of the Ge compounds is increased and the various properties of the above intermetallic compound are deteriorated. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05051677)

1. The TiAl gold which contains Ti and Al
In intergeneric chemical compound constitution amount, 0.05 atmoic % above, 2 atmoic % from here
The high *** ductility TiAl which features that Ge under is added
Type intermetallic.
2. Ti [3] Al phase I [cubic measure amount ratio Vf of 2],
0.05% or more and it set 40% or less, claim 1 statement
High *** ductile TiAl based intermetallic.
3. As for TiAl based intermetallic constitution amount, 35
Atmoic % Above, 60 atmoic % to contain Al below, the remainder T
It is i, claim high *** ductile TiAl system of 1 or 2 statements
Intermetallic.

Production of ring member made of ti-al intermetallic compound
JP07197107

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  SHIKAYA IZURU
- **International Patent Classification**
  B22F-001/00 B22F-005/02 B22F-005/10 C22C-001/04 F16J-009/26

- **Publication Information**
  JPH07197107 A 1995-08-01 [JP07197107]
- **Priority Details**
  1993JP-0353964 1993-12-29

- **Fampat family**

JPH07197107	A	1995-08-01	[JP07197107]

- **Abstract:**

(JP07197107)
PURPOSE: To improve mass productivity of a ring member made of a Ti-Al intermetallic compd. CONSTITUTION: A powder mixture for forming the Ti-Al intermetallic compd. is prepd. by mixing pure Ti powder and pure Al powder at the time of producing the ring member made of the Ti-Al intermetallic compd. Press forming is executed by using such powder mixture and setting a working temp. Tw at Tw<+600 deg.C, by which a hollow cylindrical primary intermediate body having the ratio T(sub 1)/D(sub 1) of an outside diameter D(sub 1) and thickness T(sub 1) of T(sub 1)/D(sub 1)<+0.2 is obtd. This hollow cylindrical primary intermediate body is subjected to a sintering treatment by setting a sintering temp. Ts at 650 deg.C<+Ts<+Tm-20 deg.C, by which the hollow cylindrical secondary intermediate body 5(sub 2) consisting of the Ti-Al intermetallic compd. formed by crossdiffusion of the powder mixture described above is obtd. This hollow cylindrical secondary intermediate body 5(sub 2) is subjected to slicing. As a result, the ring member is easily obtd. at a low cost.

Claims

(JP07197107)

Claims machine translated from Japanese
1. The Ti powder or the Ti alloy powder it is little
On the one hand (1) and the Al powder or the Al alloy powder little
Also mixing (2) on the one hand, the TiAl based intermetallic
The mixed powder for formation process and that mixed powder which (3) are manufactured
Process temperature Tw is set to Tw<=600.deg.C making use of (3),
It is by doing pressurization fabrication, major diameter D [1] and wall thickness T [1]
Bell-shaped ratio T [1] /D [1] is the T [1] /D [1] <=0.2
Process and the aforementioned TiAl metal which obtain the primary intermediate field (5 [1])
When designating the fusion point of between chemical compound as Tm.deg.C, the aforementioned bell-shaped 1
In the next intermediate field (5 [1]), sinterring temperature Ts 650.deg.C<=Ts<=
Administering the sinterring processing which is set to Tm-20.deg.C, the aforementioned mixed powder
The aforementioned TiAl gold which is formed end (3) by counter diffusion
The bell-shaped secondary intermediate field (5 [2] consists of intergeneric chemical compound) which profit
In [ru] process and the aforementioned bell-shaped secondary intermediate field (5 [2]) slicing
The process which administers processing and, TiAl which features that it uses
Production method of type intermetallic make ring component.
2. It pushes out the aforementioned pressurization fabrication, ratio Re R
It is extrusion processing which is set to e>=5, T of claim 1 statement
Production method of iAl based intermetallic make ring component.
3. As for the aforementioned sinterring processing, between the aforementioned TiAl metal
When fusion point Tm of chemical compound 1450.deg.C<=Tm<=1600.deg.C
Coming and sinterring temperature Ts in 900.deg.C<=Ts<=1400.deg.C, [ma]
It is pressure P [2] the heat which is set to P [2] >=49MPa respectively
To be gravitational pressure press processing, in this high-temperature gravitational pressure press processing
From, the aforementioned bell-shaped density ratio Rd is Rd>=85%
The secondary intermediate field (5 [2]) is obtained, claim T of 1 or 2 statements
Production method of iAl based intermetallic make ring component.
4. As for ring component piston ring for internal combustion engine
(7) So being, the ring which is obtained by the aforementioned slicing processing
It is agreeable to the condition 3 next intermediate field (5 [3]), and the mouth the machine to which (6) includes formation
Administering device processing, it produces the ring condition 4 next intermediate field (5 [4]),
Next, in the aforementioned ring condition 4 next intermediate field (5 [4]) finishing
Administering, it possesses the hardness which is higher than those 4 next intermediate fields (5 [4])
[ru] surface layer (9) is formed, claim 1,2 or 3 statements
Production method of TiAl based intermetallic make ring component.
5. The Ti powder or the Ti alloy powder it is little
One side (1 [1]) and, the Al powder or the Al alloy powder it is little
Also the [ku] mixing with one side (2 [1]), conversion between the TiAl metal
Process and the mixing which manufacture the mixed powder (3 [1]) for combination thing formation
Making use of the combination powder (3 [1]) process temperature Tw Tw<=600.deg.C
By doing the pressurization fabrication which is set, major diameter D [1]
[ri] where ratio T of wall thickness T [1] [1] /D [1] is the T [1] /D [1] <=0.2
Process and the aforementioned TiAl gold which obtain the [ngu] condition intermediate field (5 [1])
When designating the fusion point of being attached chemical compound as Tm.deg.C, the aforementioned ring condition center
In body (5 [1]), sinterring temperature Ts 650.deg.C<=Ts<=Tm-
Administering the sinterring processing which is set to the 20.deg.C, the aforementioned mixed powder (3
[1]) With counter diffusion the aforementioned TiAl based intermetallic raw
Forming the process which is done and, the TiAl gold which features that it uses
Production method of intergeneric chemical compound make ring component.
6. As for the aforementioned pressurization fabrication with powder forging processing [a]
The [ri], with this powder forging processing, density ratio Rd Rd>=60%
So the aforementioned ring condition intermediate field (5 [1] is) which is obtained, claim 5 description
Production method of TiAl based intermetallic make ring component of *** .
7. As for the aforementioned sinterring processing, density ratio R of ring component
In order that d is set to Rd>=85%, between the aforementioned TiAl metal
When fusion point Tm of chemical compound 1450.deg.C<=Tm<=1600.deg.C
Coming and sinterring temperature Ts in 900.deg.C<=Ts<=1400.deg.C, [ma]
It is pressure P the high-temperature still water which is set to P>=49MPa respectively
It is pressure press processing, claim TiAl of 5 or 6 statements
Production method of type intermetallic make ring component.
8. As for ring component piston ring for internal combustion engine
(7 [1]) being, the description above T which is obtained by the aforementioned sinterring processing

The ring condition secondary intermediate field which consists of the iAl based intermetallic (5
[2] Administering machining which), is agreeable and includes the formation of the mouth (6 [1])
To produce the ring condition 3 next intermediate field (5 [3]), next, aforementioned [ri]
Administering finishing to the [ngu] condition 3 next intermediate field (5 [3]), that 3
The surface layer which possesses the hardness which is higher than the next intermediate field (5 [3])
(9 [1]) it forms, claim Ti of 5,6 or 7 statements
Production method of Al based intermetallic make ring component.

High strength and high ductility ti al intermetallic compound
JP06049565

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH0649565 **A 1994-02-22 [JP06049565]**
- **Priority Details**
  1992JP-0228036 1992-08-04

- **Fampat family**

JPH0649565	A	1994-02-22	[JP06049565]

- **Abstract:**

(JP06049565)
PURPOSE: To obtain a high strength and high ductility TiAl intermetallic compound by specifying its metallic structure. CONSTITUTION: The TiAl intermetallic compound contains at least one kind of Cr and V as a third element. Its metallic structure has a lamellar structural region RL formed by alternately laminating TiAl phases La and Ti(sub 3)Al phases Lb. The content A of the third element satisfies 0.5 atomic % <+ A <+ 5 atomic %, and the volume fraction Vf of the lamellar structural region RL safisfies Vf>=8%. The third element contributes mainly to the improvement of the ductility of the TiAl intermetallic compound, and the lamellar structural region RL contributes to the improvement of the strength of the TiAl intermetallic compound. COPYRIGHT: (C)1994,JPO&Japio

Claims

(JP06049565)

1. Cr and V it is little as a 3rd element
To contain kind, metallographic structure TiAl phase (La) with Ti
[3] Al phase (Lb) with laminating alternately, the stratified organizational territory which becomes
(R [L]) to possess, content A of aforementioned 3rd element 0.5 atoms
%<=A<=5 atmoic % to be, in addition the aforementioned stratified organizational territory
(R [L]) cubic measure amount ratio Vf being Vf>=8% feature
With the high intensity high ductile TiAl based intermetallic which is done.

Production of structural member made of high-toughness and ductility intermetallic compound

JP05070861

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUNASHIMA SAKAE
  TOKUNE TOSHIO
  FUJIWARA YOSHINARI
- **International Patent Classification**
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- **Publication Information**
  JPH0570861 **A 1993-03-23 [JP05070861]**
- **Priority Details**
  1991JP-0259819 1991-09-10

- **Fampat family**

JPH0570861	A	1993-03-23	[JP05070861]

- **Abstract:**
  (JP05070861)
  PURPOSE: To obtain a high-toughness and ductility structural member consisting of a Till-based intermetallic compd. CONSTITUTION: A raw material consisting of a raw powder consisting of a TiAl intermetallic compd. having a laminated structure L, wherein the .alpha.(sub 2) phase p1 and .gamma. phase p2 are alternately laminated and having <+500.mu.m average grain diameter is burned to obtain a structural member M having the laminated structure L having an average grain diameter smaller than that of the raw powder. Since the laminated structure L is relatively refined, the toughness and ductility of the structural member M are enhanced. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05070861)

Claims machine translated from Japanese
1. It is constituted from the TiAl based intermetallic,
At the same time I [2] it possesses the stratified organization which laminates with phase and I phase alternately
Calcination to the material which consists of the raw materials powder of mean diameter 500 .micro.m or less
Administering processing, mean diameter below mean diameter of the aforementioned raw materials powder
Obtaining the structural element which has the aforementioned stratified organization which it has feature
That the high *** ductile TiAl based intermetallic make structural element which is done make
Structure method.

Manufacture of high strength and high ductility ti-al intermetallic compound JP05065558

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
  C22C-001/04

- **Publication Information**
  JPH0565558 **A 1993-03-19 [JP05065558]**
- **Priority Details**
  1991JP-0227725 1991-09-09

- **Fampat family**

JPH0565558	A	1993-03-19	[JP05065558]

- **Abstract:**
  (JP05065558)
  PURPOSE: To obtain a high strength and high ductility intermetallic compound by specifying the particle size of raw material powder. CONSTITUTION: In the method for manufacturing a Ti-Al intermetallic compound in which raw material powder contg. Ti powder and Al powder is subjected to burning treatment, the particle diameter d(sub 1) of the Ti powder is set to 100.mu.m, and the relationship between the particle diameter d(sub 1) of the Ti powder and the particle diameter d(sub 2) of the Al powder is set to d(sub 2)<+0.8(sub 1). At the time of executing the burning treatment, vacuum hot pressing which is a low pressure method is applied. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065558)

Claims machine translated from Japanese
1. The raw materials which include the Ti powder and the Al powder
The TiAl based intermetallic which does calcination processing making use of the powder
In production method, grain size d of the Ti powder [1] 1000.micro.
To set under m, in addition grain size d of the Ti powder [1] the Al powder
Grain size d end [relationship with 2] d [2] <=0.8d [was set to 1] densely
That the high intensity high ductile TiAl based intermetallic which is featured
Production method.

Manufacture of high toughness and ductility ti-al intermetallic compound
JP05065563

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  TSUNASHIMA SAKAE
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
- **International Patent Classification**
  C22C-001/04 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH0565563 **A 1993-03-19 [JP05065563]**
- **Priority Details**
  1991JP-0250283 1991-09-04

- **Fampat family**

JPH0565563	A	1993-03-19	[JP05065563]

- **Abstract:**

(JP05065563)
PURPOSE: To reduce and control the amt. of Ti(sub 3)Al phases in a lamellar structural part and to obtain a high toughness and ductility Ti-Al intermetallic compound by executing secondary heat treatment at a specified temp. to an intermediate body obtd. by subjecting the stock having isometric system Ti-Al phases to primary heat treatment at a specified temp. CONSTITUTION: When the transformation point in the case of a mixed structure constituted of Ti(sub 3)Al phases a(sub 2) and Ti-Al phases .gamma. is formed by phase transition is defined as T(sub 0), the heat treating temp. T(sub 1) is set to (T(sub 0)-50) deg.C<+T(sub 1)<+T(sub 0) deg.C, and the stock having isometric system Ti-Al phases .gamma.' is subjected to primary heat treatment. Then, an intermediate body provided with a lamellar structural part L in which the Ti(sub 3)Al phases a(sub 2) and the Ti-Al phases .gamma. are alternately deposited is obtd. Next, the heat treating temp. T(sub 2) is set to 1000<+T(sub 2)<+1300 deg.C, and the above intermediate body is subjected to secondary heat treatment. By this method, the volume fractional rate of the Ti(sub 3)Al phases a(sub 2) is controlled to 0.05 to 50%, by which the objective high toughness and ductility Ti-Al intermetallic compound Im can be obtd. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05065563)

1. With phase change Ti [3] Al phase I [2] Ti
When causing the mixed phase organization which consists of with Al phase I , the transformation point T [0] .deg.C When with doing, heat treatment temperature T [1] (T [0] - 50) the .deg.C<= T [1] <=T [0] .deg.C setting, and so on axial crystal TiAl phase I ' it possesses
By administering primary heat treatment to [ru] material M, Ti [3] Al phase I [2] and the stratified organizational section which made TiAl phase precipitate I alternately
To produce the intermediate field I which has L, next heat treatment temperature T [2] 1000.deg.C<=T [2] setting to the <=1300.deg.C, the aforementioned intermediate field
By administering secondary heat treatment to I, in the aforementioned stratified organizational section L
Ti which you can put [3] Al phase I [it features that the quantity of 2] is controlled
Production method of [ru] high ductile TiAl based intermetallic.

Manufacture of creep resistance ti-al based intermetallic compound JP05059507

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
- **International Patent Classification**
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- **Publication Information**
  JPH0559507 **A 1993-03-09 [JP05059507]**
- **Priority Details**
  1991JP-0240252 1991-08-28

- **Fampat family**

JPH0559507	A	1993-03-09	[JP05059507]

- **Abstract:**
  (JP05059507)
  PURPOSE: To obtain a Ti-Al based intermetallic compound improved in creep resistance. CONSTITUTION: Stock provided with plural layer structural parts L in which Ti-Al phases .gamma. and Ti(sub 3)Al phases .alpha.(sub 2) are alternately precipitated and primarily precipitated Ti-Al phases .gamma.' present between both adjacent layer structural parts L is applied to a heat treatment to manufacture a Ti-Al intermetallic compound. At the time of defining the transformation point in the case the structure of the Ti(sub 3)Al phase .alpha.(sub 2) is formed into a mixed phase one of the Ti(sub 3)Al phase .alpha.(sub 2) and Ti-Al phase .gamma. by phase transition as 1380 deg.C, the heat treating temp. T is set to 1330 to 1380 deg.C, and the layer structural parts L is expanded while the coarsening of the primarily precipitated Ti-Al phases .gamma.' is suppressed. COPYRIGHT: (C)1993,JPO&Japio

Claims

(JP05059507)

Claims machine translated from Japanese
1. TiAl phase I and Ti [3] Al phase I [2]
Plural stratified organizational sections L and the phase which were made to precipitate alternately both stratified it is placed next
The pro-eutectoid TiAl phase I which exists between organizational section L ' with the material which it has
Administering heat treatment, the method which produces the TiAl based intermetallic
Being law, Ti [3] Al phase I [2], Ti [3] Al phase I [2]
When phase changing to the mixed phase organization which consists of with TiAl phase I , change
When T [0] .deg.C with doing the condition point, heat treatment temperature T, (T [0] - 5
0) .deg.C<=T<=T [0] .deg.C setting, pro-eutectoid TiAl phase I '
While controlling coarseness, assuring the enlargement of stratified organizational section L special
The creep resistance TiAl based intermetallic which is made collection/symbol production
Law.

Production of structural member made of tial intermetallic compound
JP04210401

- **Patent Assignee**
  HONDA MOTOR
- **Inventor**
  FUJIWARA YOSHINARI
  TOKUNE TOSHIO
  TSUNASHIMA SAKAE
  YAGI KAZUHIKO
- **International Patent Classification**
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- **Publication Information**
  JPH04210401 A 1992-07-31 [JP04210401]
- **Priority Details**
  1990JP-0401811 1990-12-13

- **Fampat family**

JPH04210401	A	1992-07-31	[JP04210401]

- **Abstract:**
  (JP04210401)
  PURPOSE: To produce a high strength structural member made of TiAl intermetallic compound at low sintering temp. by mixing, by agitation, powdered Ti and powdered Al together with powdered TiH(sub 2), compacting the resulting composite powder, exerting sintering treatment, and applying dehydrogenation treatment to the resulting sintered compact. CONSTITUTION: Powdered Ti and powdered Al are mixed by means agitation in the presence of powdered TiH(sub 2) by the use of a high energy ball mill, etc., by which a composite powder consisting of Ti, Al, and TiH(sub 2) and excellent in dispersibility is formed. Subsequently, a green compact is formed by using this composite powder. This green compact is sintered at about 800-1200 deg.C by means of hot isostatic pressing. The resulting sintered compact is subjected to dehydrogenation treatment. By this method, the structural member made of TiAl intermetallic compound having high density and high strength can be obtained. COPYRIGHT: (C)1992,JPO&Japio

Claims

(JP04210401)
JP40181190 1990-12-13 [1990JP-0401811]