Number of documents: 25

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JP06192818	SiC fiber-reinforced TiAl composite material MITSUBISHI HEAVY INDUSTRIES
JP01312048	TiAl basic heat resistant alloy MITSUBISHI HEAVY INDUSTRIES
JP2000199025	TiAl INTERMETALLIC COMPOUND BASE ALLOY, ITS PRODUCTION, TURBINE MEMBER AND ITS PRODUCTION MITSUBISHI HEAVY INDUSTRIES
JP06023569	Method for joining tial intermetallic compound and mo alloy MITSUBISHI HEAVY INDUSTRIES

JP2004090130	JOINING METHOD FOR TiAL-BASE ALLOY AND STEEL PRODUCT MITSUBISHI HEAVY INDUSTRIES
JP2002053976	OXIDATION RESISTANCE COATING FOR TiAl-BASED ALLOY MITSUBISHI HEAVY INDUSTRIES
JP09176764	Ti-al base intermetallic compound matrix alloy MITSUBISHI HEAVY INDUSTRIES
JP10265869	Silicon carbide series fiber-reinforced titanium-alum. series intermetallic compound composite material MITSUBISHI HEAVY INDUSTRIES
JP10060564	Ti-al intermetallic compound base alloy MITSUBISHI HEAVY INDUSTRIES
JP07197154	Titanium aluminum base alloy and its production MITSUBISHI HEAVY INDUSTRIES

TiAl based alloy, production process therefor, and rotor blade using same
EP1127949

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
  SHINDO KENTARO
  TAKEYAMA MASAO
- **International Patent Classification**
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EP1127949	A2	2001-08-29	[EP1127949]
US2001022946	A1	2001-09-20	[US20010022946]
JP2001316743	A	2001-11-16	[JP2001316743]
EP1127949	A3	2002-09-18	[EP1127949]
US6669791	B2	2003-12-30	[US6669791]
US2004055676	A1	2004-03-25	[US20040055676]
EP1127949	B1	2005-04-27	[EP1127949]
DE60110294	D1	2005-06-02	[DE60110294]
DE60110294	T2	2006-03-09	[DE60110294]
JP4287991	B2	2009-07-01	[JP4287991]
US7618504	B2	2009-11-17	[US7618504]

- **Abstract:**
  (EP1127949)
  A TiAl based alloy having excellent strength as well as an improvement in toughness at room temperature, in particular an improvement in impact properties at room temperature, and a production method thereof, and a blade using the same are provided. This TiAl based alloy has a microstructure in which lamellar grains having a mean grain diameter of from 1 to 50m are closely arranged. The alloy composition is Ti-(42-48)Al-(5-10) (Cr and/or V) or Ti-(38- 43)Al-(4-10)Mn. The alloy can be obtained by subjecting the alloy to high-speed plastic working in the cooling process, after the alloy has been held in an equilibrium temperature range of the alpha phase or the (alpha + beta) phase.

Claims

(EP1127949)

1. A TiAl based alloy having a microstructure in which lamellar grains having a mean grain diameter of from 1 to 50m are closely arranged, with an alpha 2 phase and a gamma phase being laminated therein alternately.
2. A TiAl based alloy according to claim 1, having a microstructure in which lamellar grains having a mean grain diameter of from 1 to 50m are closely arranged, with an alpha 2 phase and a gamma phase being laminated therein alternately, and a matrix comprising a beta phase filling the gaps between the lamellar grains.
3. A TiAl based alloy according to claim 1, comprising 40 to 48 atomic % of Al, 5 to 10 atomic % of one or more kinds selected from Cr and V, with the remainder being Ti and inevitable impurities.
4. A TiAl based alloy according to claim 1, comprising 38 to 48 atomic % of Al, 4 to 10 atomic % of Mn, with the remainder being Ti and inevitable impurities.
5. A TiAl based alloy according to claim 3, containing one or more kinds of elements selected from the group consisting of C, Si, Ni, W, Nb, B, Hf, Ta, and Zr in an amount of from 0.1 to 3 atomic % in total.
6. A TiAl based alloy according to claim 4, containing one or more kinds of elements selected from the group consisting of C, Si, Ni, W, Nb, B, Hf, Ta, and Zr in an amount of from 0.1 to 3 atomic % in total.
7. A TiAl based alloy according to any one of claims 1 to 5, wherein a Charpy impact test value specified in JIS-Z2242 is 3J or higher at room temperature.
8. A production method of a TiAl based alloy comprising:
a step for holding a TiAl based alloy material containing Al at least in an amount of from 43 to 48 atomic % in an equilibrium temperature range of an alpha phase;
and
a step for subjecting the TiAl based alloy material held at that temperature to high-speed plastic working, while cooling the material to a predetermined working terminal temperature.
9. A production method of a TiAl based alloy according to claim 8, wherein said holding temperature is from 1230 DEG.C to 1400 DEG.C.
10. A production method of a TiAl based alloy according to claim 8, wherein said working terminal temperature is 1200 DEG.C.
11. A production method of a TiAl based alloy according to claim 8, wherein said TiAl based alloy material is held at said holding temperature with the material being covered with a thermal insulation material, and then said TiAl based alloy is subjected to high-speed plastic working, together with said thermal insulation material.
12. A production method of a TiAl based alloy according to claim 8, wherein a forging method is used as said high-speed plastic working.
13. A production method of a TiAl based alloy according to claim 8, wherein said high-speed plastic working is performed at a cooling speed of from 50 to 700 DEG.C/min.
14. A production method of a TiAl based alloy comprising:
a step for holding a TiAl based alloy material containing Al at least in an amount of from 38 to 44 atomic % in an equilibrium temperature range of a (alpha + beta) phase;
and a step for subjecting the TiAl based alloy material held at said temperature to high-speed plastic working, while cooling said material to a predetermined working terminal temperature.
15. A production method of a TiAl based alloy according to claim 14, wherein said holding temperature is from 1150 DEG.C to 1300 DEG.C.
16. A production method of a TiAl based alloy according to claim 14, wherein said working terminal temperature is 1000 DEG.C.
17. A production method of a TiAl based alloy according to claim 14, wherein a forging method is used as said high-speed plastic working.
18. A production method of a TiAl based alloy according to claim 14, wherein said high-speed plastic working is performed at a cooling speed of from 50 to 700 DEG.C/min.
19. A blade using the TiAl based alloy according to any one of claims 1 to 7.

Tial-based alloy, process for production of the same, and rotor blade comprising the same

WO2009113335

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES TOKYO INSTITUTE OF TECHNOLOGY
- **Inventor**
  SHINDO KENTARO
  TETSUI TOSHIMITSU
  TAKEYAMA MASAO
- **International Patent Classification**
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- **US Patent Classification**
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- **CPC Code**
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WO2009113335	A1	2009-09-17	[WO2009113335]
JP2009215631	A	2009-09-24	[JP2009215631]
EP2251445	A1	2010-11-17	[EP2251445]
US2010316525	A1	2010-12-16	[US20100316525]
EP2251445	A4	2011-12-14	[EP2251445]

- **Abstract:**
  (EP2251445)
  A hot-forged TiAl-based alloy having excellent oxidation resistance and high strength at high temperatures, and a process for producing such an alloy. A TiAl-based alloy comprising Al: (40+a) atomic % and Nb: b atomic %, with the remainder being Ti and unavoidable impurities, wherein a and b satisfy formulas (1) and (2) below. (Equation image a01" not included in text) (Equation image a02" not included in text) Also, a TiAl-based alloy comprising Al: (40+a) atomic % and Nb: b atomic %, and further comprising one or more elements selected from the group consisting of V: c atomic %, Cr: d atomic % and Mo: e atomic %, with the remainder being Ti and unavoidable impurities, wherein a to e satisfy formulas (3) to (9) shown below. (Equation image a03" not included in text) (Equation image a04" not included in text) (Equation image a05" not included in text) (Equation image a06" not included in text) (Equation image a07" not included in text) (Equation image a08" not included in text) (Equation image a09" not included in text)

Claims

(EP2251445)

1. A TiAl-based alloy comprising
Al: (40+a) atomic % and
Nb: b atomic %,
with a remainder being Ti and unavoidable impurities,
wherein
a and b satisfy formulas (1) and (2) below: (Equation image 31 not included in text)
and (Equation image 32 not included in text)

2. A TiAl-based alloy comprising
Al: (40+a) atomic % and
Nb: b atomic. %, and further comprising
one or more elements selected from the group consisting of
V: c atomic %,
Cr: d atomic % and
Mo: e atomic %,
with a remainder being Ti and unavoidable impurities,
wherein
a to e satisfy formulas (3) to (9) shown below: (Equation image 33 not included in text) (Equation image 34 not included in text) (Equation image 35 not included in text) (Equation image 36 not included in text) (Equation image 37 not included in text) (Equation image 38 not included in text)
and (Equation image 39 not included in text)

3. The TiAl-based alloy according to claim 1 or 2, having a metal structure comprising aligned lamellar grains in which an alpha 2-phase and a gamma -phase are stacked in an alternating manner.

4. A process for producing a TiAl-based alloy, the process comprising: holding a TiAl-based alloy material, comprising
Al: (40+a) atomic % and
Nb: b atomic %,
with a remainder being Ti and unavoidable impurities, wherein a and b satisfy formulas (1) and (2) below: (Equation image 40 not included in text)
and (Equation image 41 not included in text) at a holding temperature within an equilibrium temperature range for an (alpha +beta) phase, and subjecting the TiAl-based alloy material held at the holding temperature to high-speed plastic working while cooling to a predetermined final working temperature.

5. A process for producing a TiAl-based alloy, the process comprising: holding a TiAl-based alloy material, comprising
Al: (40+a) atomic % and
Nb: b atomic %, and further comprising
one or more elements selected from the group consisting of
V: c atomic %,
Cr: d atomic % and
Mo: e atomic %,
with a remainder being Ti and unavoidable impurities, wherein a to e satisfy formulas (3) to (9) shown below: (Equation image 42 not included in text) (Equation image 43 not included in text) (Equation image 44 not included in text) (Equation image 45 not included in text) (Equation image 46 not included in text) (Equation image 47 not included in text)
and (Equation image 48 not included in text) at a holding temperature within an equilibrium temperature range for an (alpha +beta) phase, and subjecting the TiAl-based alloy material held at the holding temperature to high-speed plastic working while cooling to a predetermined final working temperature.

6. The process for producing a TiAl-based alloy according to claim 4 or claim 5, wherein
the holding temperature is not less than 1150 deg.C and not more than 1350 deg.C.

7. A process for producing a TiAl-based alloy according to any one of claim 4 to claim 6, wherein
the final working temperature is not less than 1150 deg.C.

8. A process for producing a TiAl-based alloy according to any one of claim 4 to claim 7, wherein
a forging process is used for the high-speed plastic working.

9. A rotor blade that uses the TiAl-based alloy according to any one of claim 1 to claim 3.

The TiAl based intermetallic material which is obtained with thermomechanical treatment method and the said method of the TiAl based intermetallic

JP04099225

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TSUZUKI TAKAYUKI
  SATO HIROAKI
- **International Patent Classification**
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  1990JP-0209178 1990-08-09

- **Fampat family**

JPH0499225	A	1992-03-31	[JP04099225]
JP2820513	B2	1998-11-05	[JP2820513]

- **Abstract:**

(JP2820513)
PURPOSE:To produce a TiAl intermetallic compound material excellent in strength at ordinary temp. and ductility by subjecting a TiAl intermetallic compound to high-degree plastic working at high temp. and further to plastic working at low temp., and forming a fine and uniform structure. CONSTITUTION:Plastic working is applied to a TiAl intermetallic compound at >=1050 deg.C at >=50% true strain (>=40% reduction of area) to form a microstructure into equiaxed grain structure. Subsequently, plastic working is further exerted at a single-step or two-step temp. in the range lower than the above temp., preferably at about 1050-700 deg.C. By this treatment, the structure can be efficiently formed into fine and equiaxial microstructure.

Claims

(JP2820513)

Claims machine translated from Japanese
1. At temperature above 1050.deg.C ratio under logarithmic strain 50% (pressure
40%) Doing the 1st deformation processing above, microstructure and the like
The to axial grain after converting, in the temperature range which is lower than the 1050.deg.C 2nd time ***
Doing characteristic processing, it makes dynamic recrystallization cause or, or motion
At the temperature which is lower than mark recrystallization temperature 2nd deformation processing the line [tsu]
After introducing the [te] estimate distortion, in the temperature range which is lower than the 1050.deg.C
Furthermore doing 3rd deformation processing, it makes dynamic recrystallization cause
And so on make axial minute microstructure efficiently due to especially
Thermomechanical treatment method of the TiAl based intermetallic which is featured.
2. The claim Ti where (1) is obtained with thermomechanical treatment method
Al based intermetallic material.

Titanium aluminum intermetallic compound based alloy and method of fabricating a product from the alloy

EP1308529

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
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EP1308529	A1	2003-05-07	[EP1308529]
JP2003147475	A	2003-05-21	[JP2003147475]
US2003111141	A1	2003-06-19	[US20030111141]
EP1308529	B1	2005-01-26	[EP1308529]
DE60202731	D1	2005-03-03	[DE60202731]
DE60202731	T2	2005-12-29	[DE60202731]
JP4107830	B2	2008-06-25	[JP4107830]

- **Abstract:**
  (EP1308529)
  A titanium aluminum intermetallic compound based alloy superior in creep strength and low cycle fatigue strength made by casting. The alloy has lamellar structure. A volume ratio of non-lamellar structure of the alloy is equal to or less than 3 volume percent. Diameters of lamellar grains included in the alloy are equal to or less than 200 mu m. Lamellar spacing of the lamella structure included in the alloy is equal to or less than 2 mu m. <IMAGE>

Claims

(EP1308529)

1. An titanium aluminum intermetallic compound based alloy, wherein a volume ratio of non-lamellar structure is equal to or less than 3 volume percent, and diameters of lamellar grains are equal to or less than 200 m, and a lamellar spacing of lamellar structure is equal to or less than 2 m.
2. The titanium aluminum intermetallic compound based alloy according to claim 1, comprising boron.
3. The titanium aluminum intermetallic compound based alloy according to claim 2, wherein a boron concentration is in the range of 0.2 to 1.2 atomic percent.
4. The titanium aluminum intermetallic compound based alloy according to claim 1, comprising (measured in atomic percent):
43-48% aluminum;

2.0-5.0% niobium;

0.2-1.2% tungsten;

0.1-1.0% nickel;

0.2-1.2% boron;
and a remainder including titanium plus impurities.
5. The titanium aluminum intermetallic compound based alloy according to claim 4, further comprising manganese.
6. The titanium aluminum intermetallic compound based alloy, according to claim 4, wherein a manganese concentration is in the range of 0.2 to 1.2 atomic percent.
7. The titanium aluminum intermetallic compound based alloy, according to claim 4, further comprising chromium.
8. The titanium aluminum intermetallic compound based alloy according to claim 7, wherein a chromium concentration is in the range of 0.2 to 1.2 atomic percent.
9. The titanium aluminum intermetallic compound based alloy according to claim 4, further comprising silicon.
10. The titanium aluminum intermetallic compound based alloy according to claim 9, wherein a silicon concentration is in the range of 0.1 to 1.0 atomic percent.
11. The titanium aluminum intermetallic compound based alloy according to claim 4, further comprising carbon.
12. The titanium aluminum intermetallic compound based alloy according to claim 11, wherein a carbon concentration is in the range of 0.1 to 0.5 atomic percent.
13. A method of fabricating a product from titanium aluminum intermetallic compound based alloy comprising:
casting an titanium aluminum intermetallic compound based alloy into a product;

executing hot isostatic pressing on said product;

heat-treatment of said product in a non-oxidizing environment after said hot isostatic pressing;

rapidly cooling said product after said heat-treating.
14. The method according to claim 13, wherein said product is heated at 1320 DEG. to 1370 DEG. C. during said heat-treatment.
15. The method according to claim 14, wherein said product is cooled to 1000 DEG.C. at a cooling rate of 30 DEG. to 100 DEG. C./min. during said rapid cooling.
16. The method according to claim 15, further comprising:
second heat-treatment of said product after said rapid cooling;
and
slowly cooling said product after said second heat-treatment.
17. The method according to claim 16, wherein said product is heated at 900 DEG. to 1050 DEG. C. during said second heat-treatment.
18. The method according to claim 16, wherein said product is cooled at a cooling rate equal to or less than 10 DEG. C./min. during said slowly cooling.
19. The method according to claim 13, wherein said titanium aluminum intermetallic compound based alloy includes boron.
20. The method according to claim 19, wherein a boron concentration of said titanium aluminum intermetallic compound based alloy is in the range of 0.2 to 1.2 atomic percent.

TiAl JOINED BODY AND MANUFACTURING METHOD FOR TiAl JOINED BODY US20150044505

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  NISHIKAWA KOSUKE
  HIRAMATSU NORIYUKI
  FUKUSHIMA AKIRA
- **International Patent Classification**
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- **CPC Code**
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- **Fampat family**

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JP2015036148	A	2015-02-23	[JP2015036148]

- **Abstract:**
  (US20150044505)
  A manufacturing method of a TiAl joined body includes: an arranging step and a heating step. The arranging step is a step of arranging a plurality of members which contains a TiAl intermetallic compound and insert materials which contain Ti as a major element, Cu and Ni such that each of the insert materials is inserted between two adjacent members of the plurality of members. The heating step is a step of heating the plurality of members and the insert materials in a non-oxidizing atmosphere at a temperature above melting points of the insert materials and below melting points of the plurality of members.

Claims

(US20150044505)

What is claimed is:

1.

A manufacturing method of a TiAl joined body comprising: arranging a plurality of members which contains a TiAl intermetallic compound and insert materials which contain Ti as a major element, Cu and Ni such that each of the insert materials is inserted between two adjacent members of the plurality of members; and

heating the plurality of members and the insert materials in a non-oxidizing atmosphere at a temperature above melting points of the insert materials and below melting points of the plurality of members.

2. The manufacturing method of a TiAl joined body according to claim 1, wherein the heating step is performed without actively applying pressure to the plurality of members.

3. The manufacturing method of a TiAl joined body according to claim 1, wherein each of the insert materials includes one of a lamination material in which Ti foil, Cu foil and Ni foil are laminated, a lamination material in which Ti foil and Cu -- Ni foil are laminated and Ti -- Cu -- Ni foil.

4. The manufacturing method of a TiAl joined body according to claim 3, wherein, in the arranging step, each of the insert materials is pressed by one of the two adjacent members to the other of the two adjacent members by using own weight of the one of the two adjacent members.

5. The manufacturing method of a TiAl joined body according to claim 1, wherein each of the insert materials includes paste which includes a powdered brazing filler metal containing Ti, Cu and Ni.

6. The manufacturing method of a TiAl joined body according to claim 5, wherein, in the arranging step, each of the insert materials is inserted and supported in a predetermined clearance between the two adjacent members.

7. The manufacturing method of a TiAl joined body according to claim 1, wherein each of the plurality of members contains Al of 35 to 55 at. %, wherein each of the insert materials contains Cu of 5 to 20 wt % and Ni of 5 to 20 wt %, and

wherein the heating step is performed in heating temperature of 1000 to 1250 degrees Celsius.

8. The manufacturing method of a TiAl joined body according to claim 1, wherein each of the plurality of members is cylindrically-shaped or ring-shaped.

9. A TiAl joined body comprising: a plurality of members configured to contain a TiAl intermetallic compound; and

joining layers, each of which configured to be formed along a faying surface between two adjacent members of the plurality of members,

wherein each of joining layers includes:

a first diffusion layer configured to be formed on a side of one of the two adjacent members, and

a second diffusion layer configured to be formed on a side of the other of the two adjacent members,

wherein the first diffusion layer and the second diffusion layer contain Cu and Ni, and contain at least one of an alpha -phase Ti-based metal and a beta -phase Ti-based metal.

10. The TiAl joined body according to claim 9, wherein each of the plurality of members contains Al of 35 to 55 at. %, and wherein the highest concentration of each of Cu and Ni is approximately 2 to 3 wt % in each of the first diffusion layer and the second diffusion layer.

11. The TiAl joined body according to claim 9, wherein each of the first diffusion layer and the second diffusion layer has an acicular structure.

12. The TiAl joined body according to claim 9, wherein a ratio of Cu becomes smaller at a farther portion from the faying surface, wherein the ratio of Ni becomes smaller at a farther portion from the faying surface, and

wherein the ratio of Al becomes larger at a farther portion from the faying surface.

13. The TiAl joined body according to claim 9, wherein each of the plurality of members is cylindrically-shaped or ring-shaped.

The TiAl basic alloy and its production method and the rotor blade which uses that

JP2002356729

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  SHINDO KENTARO
  TETSUI TOSHIMITSU
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- **Fampat family**

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JP4209092	B2	2009-01-14	[JP4209092]

- **Abstract:**

(JP2002356729)
PROBLEM TO BE SOLVED: To provide a TiAl alloy having high -temperature strength and impact characteristics required for a heat-resistant alloy and also having excellent machinability, and to provide the manufacturing method and a moving blade using the same. SOLUTION: This TiAl alloy has a fine structure in which lamellar grains of 1 to 65 μm average grain size where the α2 -phase and γ-phase are alternately stacked are arranged and the spacing among the lamellar grains is filled with matrix containing the β-phase and γ-phase; the area fraction of the above lamellar grains is 30 to 70%; the spacing among the α2 -phases within the lamellar grains, i.e., lamellar spacing is 0.4 to 1.5 μm; and the area fraction of the above β-phase is 5 to 15%. Moreover, the moving blade is constituted using the TiAl alloy with the above composition.

Claims

(JP2002356729)

Claims machine translated from Japanese
1. I [2] flat phase and I phase are laminated alternately
The lame Ra grain of equal grain size 1-65 .micro.m to disperse, the said lame Ra
The base where I phase and I phase are included burying the gap of the grain, the minuteness which becomes
To possess organization, surface integral ratio of aforementioned lame Ra grain the 30-70%
So to be, lame Ra interval inside the aforementioned lame Ra grain the 0.4-
1.5 To be .micro.m, surface integral ratio of the aforementioned I phase with the 5-15%
The TiAl basic alloy which features a certain thing.
2. Al: 38-45 atmoic %, Mn: 3-1
0 atmoic %, remainder: Consisting of Ti and the inevitable impurity
In the claim 1 which is made feature the TiAl basic alloy of statement.
3. Al: 38-45 atmoic %, Cr or V
1 kind or more inside: 3-10 atmoic %, remainder: Ti and failure
In the claim 1 which features that it consists of the *** impurity T of statement
iAl basic alloy.
4. The 1-2.5 atmoic % contain Nb
The claim either 1 which is featured or 3 in 1 sections statement
TiAl basic alloy.
5. 1 kinds or more which are chosen from Mo, W and Zr
The claim which features that the 0.5-2 atmoic % it contains the element
Section either 1 or 4 in 1 sections TiAl basic alloy of statement.
6. 0.1-0.4 atmoic % C (carbon) containing
The claim either 1 which features that it possesses or 5 1
In section TiAl basic alloy of statement.
7. 1 kinds or more which are chosen from Si, Ni and Ta
It features that the 0.2-1.0 atmoic % it contains the element
[ru] claim either 1 or 6 in 1 sections TiAl basis of statement
It alloys.
8. At least the 38-45 atmoic % Al and,
The 3-10 atmoic % the TiAl basic alloy material which contains Mn
(.alpha.+.beta.) the 1st heating manufacture which is kept in the terminal temperature territory of phase
About and,
The TiAl basic alloy material which is kept in the said temperature, specified processing most
While cooling to end temperature, high-speed plasticity the process process which processes and,
TiAl basic alloy material after the said processing, (.alpha.+.beta.) equilibrium of phase
Temperature range or (.alpha.+.beta.+.gamma.) terminal temperature limits of phase or
(.beta.+.gamma.) The 2nd heating process which is kept in the terminal temperature territory of phase
Production method of the TiAl basic alloy which features that it has.
9. At least the 38-45 atmoic % Al and,
The 3-10 atmoic % Cr and/or TiA which contains V
The I basic alloy material, (.alpha.+.beta.) is kept in the terminal temperature territory of phase
[ru] 1st heating process and,
The TiAl basic alloy material which is kept in the said temperature, specified processing most
While cooling to end temperature, high-speed plasticity the process process which processes and,
TiAl basic alloy material after the said processing, (.alpha.+.beta.) equilibrium of phase
Temperature range or (.alpha.+.beta.+.gamma.) terminal temperature limits of phase or
(.beta.+.gamma.) The 2nd heating process which is kept in the terminal temperature territory of phase
Production method of the TiAl basic alloy which features that it has.
10. As the aforementioned TiAl basic alloy material, the 1-
2.5 atmoic % using those which contain Nb feature
That in the claim 8 which is done or 9 production of the TiAl basic alloy of statement
Method.
11. As the aforementioned TiAl basic alloy material, 0.

The 1-0.4 atmoic % C (carbon) those which are contained are used
The claim either 8 which features thing or 10 in 1 sections
Production method of TiAl basic alloying the statement.
12. Retention temperature of the aforementioned 1st heating process, 11
The claim 8 which features that it is the 50-1350.deg.C it is not
It does, either of 11 in 1 sections production how TiAl basic to alloy of statement
Law.
13. Retention temperature of the aforementioned 2nd heating process, 10
The claim 8 which features that it is the 00.deg.C-1350.deg.C

It does to be, either of 12 in 1 sections production of the TiAl basic alloy of statement Method.

14. The aforementioned process terminal temperature is the 1000.deg.C The claim either 8 which features thing or 13 in 1 sections Production method of TiAl basic alloying the statement.

15. Cooling rate of the aforementioned process process 50-70 The claim 8 which features that it processes as 0.deg.C/amount it is not It does, either of 14 in 1 sections production how TiAl basic to alloy of statement Law.

16. Cooling rate of the aforementioned 2nd heating process 5-5 The claim 8 which features that it processes as 0.deg.C/amount it is not It does, either of 15 in 1 sections production how TiAl basic to alloy of statement Law.

17. In the aforementioned process process, the aforementioned high-speed plasticity Way the effective distortion with processing, it becomes 0.8 or more, the description above T The claim 8 which features that the iAl basic alloy material is processed Or either of 16 in 1 sections TiAl basic alloy of statement make Structure method.

18. In the aforementioned process process, the aforementioned high-speed plasticity Way the effective distortion with processing, it becomes the 1.2-4.0, before The claim which features that the description TiAl basic alloy material is processed In section 17 production method of TiAl basic alloying the statement.

19. As the aforementioned high-speed deformation processing using the forging method The claim either 8 which features [ru] thing or 18 1 sections Production method of TiAl basic alloying the statement.

20. The aforementioned forging method, is high-speed four surface forging, it is dense That in the claim 19 which is featured the TiAl basic alloy of statement make Structure method.

21. Claim either 1 or 7 in 1 sections description The rotor blade which features that the TiAl basic alloy of the *** is used.

METHOD FOR PRODUCING HEAT RESISTANT TiAl BASED ALLOY MEMBER, AND HEAT RESISTANT TiAl BASED ALLOY MEMBER

JP2007056340

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  SHINDO KENTARO
  KAMATA MASATOMO

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

- **Publication Information**
  JP2007056340 A 2007-03-08 [JP2007056340]
- **Priority Details**
  2005JP-0244886 2005-08-25

- **Fampat family**

JP2007056340	A	2007-03-08	[JP2007056340]

- **Abstract:**
  (JP2007056340)
  PROBLEM TO BE SOLVED: To provide a method for producing a heat resistant TiAl based alloy member with a high mass-productivity, and to provide a heat resistant TiAl based alloy member. SOLUTION: The production method contains: (1) a casting stage (S11) where a TiAl based alloy is cast, so as to obtain an ingot 11; (2) a hot extrusion stage (S12) where the TiAl based ingot is hot-extruded, so as to obtain an ingot extruded material 12; and (3) a hot forging stage (S13) where the ingot extruded material is hot-forged, so as to obtain a forged material 13. In this way, the heat resistant TiAl based alloy member having high creep strength can be obtained. COPYRIGHT: (C)2007,JPO&INPIT

Claims

(JP2007056340)

Claims machine translated from Japanese

1. 1) Casting the TiAl basic alloy, the casting which obtains the ingot and,
2) The heat pushing out the TiAl basic ingot, the high-temperature extrusive process which obtains the ingot extrusive material and,
3) The heat forging the ingot extrusive material, production method of the heat-resistant TiAl basic alloy component which features that the hot forging process which you train and obtains bucking is included.

2. 1) Casting the TiAl basic alloy, the casting which obtains the ingot and,
2) The heat pushing out the TiAl basic ingot, the high-temperature extrusive process which obtains the ingot extrusive material and,
3) The heat forging the ingot extrusive material, the hot forging process which you train and obtains bucking and,
4) Processing training bucking roughly due to machining, roughly roughly production method of the heat-resistant TiAl basic alloy component which features that process which obtains the processed item process is included.

3. 1) Casting the TiAl basic alloy, the casting which obtains the ingot and,
2) The heat pushing out the TiAl basic ingot, the high-temperature extrusive process which obtains the ingot extrusive material and,
3) The heat forging the ingot extrusive material, the hot forging process which you train and obtains bucking and,
4) Processing training bucking roughly due to machining, roughly it is rough process which obtains the processed item process and,
5) Roughly heat-treating the processed item, the crystal grain production method of the heat-resistant TiAl basic alloy component which features that the heat treatment process which obtains the heat treatment item which coarsens is included.

4. 1) Casting the TiAl basic alloy, the casting which obtains the ingot and,
2) The heat pushing out the TiAl basic ingot, the high-temperature extrusive process which obtains the ingot extrusive material and,
3) The heat forging the ingot extrusive material, the hot forging process which you train and obtains bucking and,
4) Processing training bucking roughly due to machining, roughly it is rough process which obtains the processed item process and,
5) Roughly heat-treating the processed item, the crystal grain the heat treatment process which obtains the heat treatment item which coarsens and,
6) Processing the heat treatment item precisely, production method of the heat-resistant TiAl basic alloy component which features that it includes the precise process process which it makes the precise processed item.

5. Claim either 1 or 4 in one,
Furthermore, production method of the heat-resistant TiAl basic alloy component which features that the connecting process which connects with the other metal component is included.

6. Claim either 1 or 5 in one,
Extrusive direction of the ingot extrusive material which is obtained by the aforementioned high-temperature extrusive process and average crystal grain size of vertical section push out, and production method of the heat-resistant TiAl basic alloy component which features that they are 1/10 or less of average crystal grain size of the ingot before.

7. Claim either 1 or 6 in one,
Production method of the heat-resistant TiAl basic alloy component which features that extrusion ratio of the ingot extrusive material of the aforementioned high-temperature extrusive process is 5 or more.

8. Claim either 1 or 6 in one,
Production method of the heat-resistant TiAl basic alloy component which features that forging temperature of the aforementioned hot forging process is the 1220-1350.deg.C.

9. Claim either 1 or 4 in one,
The case of the aforementioned hot forging process, in order cooling rate after the forging processing, for area ratio of lamella organization to become 60% or less, production method of the heat-resistant TiAl basic alloy component which features that it cools.

10. Claim in 3 or 4,
The aforementioned heat treatment process, consists of 2 processes, 1st heat treatment process is the 1330-1380.deg.C, production method of the heat-resistant TiAl basic alloy component which features that 2nd heat treatment process is the 900-1000.deg.C.

11. In claim 10,
Production method of the heat-resistant TiAl basic alloy component which features that cooling rate of the aforementioned 1st heat treatment process is 50-100.deg.C/amount.

12. In claim 10,
The description above average crystal grain size of the heat treatment item after the heat treatment, production method of the heat-resistant TiAl basic alloy component which features that they are 10 times that before the heat treatment.

13. Claim either 1 or 12 in one,
The aforementioned TiAl basic alloy, Nb, C, Mo, Ni, Mn and Cr, V, either W, B and the rare earth element kind or production method of the heat-resistant TiAl basic alloy component which features that it includes above these at least two kinds.

14. Claim either 1 or 13 in one,
The aforementioned TiAl basic alloy component, the turbine wheel and the engine exhaust valve, the turbine bucket, production method of the heat-resistant TiAl basic alloy component which features that it is either the turbine rotor or the turbine disks.

15. The heat-resistant TiAl basic alloy component which features that it is obtained claim either 1 or 13 by the production method of one heat-resistant TiAl basic alloy component.

TiAl intermetallic compound-based alloys and methods for preparing same
WO9612827

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18
- **US Patent Classification**
  PCLO=148421000 PCLX=420418000
- **CPC Code**
  C22C-014/00

- **Publication Information**
  WO9612827 A1 1996-05-02 [WO9612827]
- **Priority Details**
  1994JP-0283952 1994-10-25
  1995JP-0006262 1995-01-19
  1995WO-JP01349 1995-07-06

- **Fampat family**

WO9612827	A1	1996-05-02	[WO9612827]
JPH08120372	A	1996-05-14	[JP08120372]
JPH08199264	A	1996-08-06	[JP08199264]
DE19581384	T1	1996-12-19	[DE19581384T]
DE19581384	C2	1999-03-11	[DE19581384]
US6051084	A	2000-04-18	[US6051084]
JP3332615	B2	2002-10-07	[JP3332615]

- **Abstract:**
  (US6051084)
  PCT No. PCT/JP95/01349 Sec. 371 Date Mar. 26, 1996 Sec. 102(e) Date Mar. 26, 1996 PCT Filed Jul. 6, 1995 PCT Pub. No. WO96/12820 PCT Pub. Date May 2, 1996TiAl intermetallic compound-based alloys comprising Ti, Al, Nb and Cr and, if necessary, further comprising Ni and Co, which have excellent plastic workability, good resistance to oxidation at high temperatures, high strength or good creep resistance.

Claims

(US6051084)

I claim:

1. A TiAl intermetallic compound-based alloy consisting essentially of

a Ti concentration of 39 to 47 atomic percent,

an Al concentration of 44 to 47 atomic percent,

a Nb concentration of 6 to 10 atomic percent,

a Cr concentration of 1 to 3 atomic percent, and

an additional material having a concentration of 1 to 3 atomic percent, the additional material being one of Nickel (Ni), Cobalt (Co) and (Ni+Co).

TiAl based intermetallic and the manufacturing method
JP06145933

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TSUZUKI TAKAYUKI
  SATO HIROAKI
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH06145933 A 1994-05-27 [JP06145933]
- **Priority Details**
  1992JP-0327600 1992-11-13

- **Fampat family**

JPH06145933	A	1994-05-27	[JP06145933]
JP2813516	B2	1998-10-22	[JP2813516]

- **Abstract:**
  (JP06145933)
  PURPOSE:To provide the heat treatment method for the TiAl intermetallic compd. and the TiAl intermetallic compd. having excellent cold ductility and high-temp. strength. CONSTITUTION:A material having the equiaxial grain structure of the TiAl intermetallic compd. contg. 42 to 49% Al by atomic ratio and having at least a gamma phase and alpha2 phase as constituting phases is heated and held to and at a temp. range of an alpha transformation temp. to an alpha transformation temp.+30 deg.C to form the structure in which coarse lamella structure of >=200mum diameter and gamma phase grains of <=100mum diameter at the grain boundaries thereof and/ or the lamella grains are made to remain. The TiAl intermetallic compd. having the structure constituted by mainly having the lamella grain structure consisting of the gamma phase composed of TiAl and the alpha2 phase composed of Ti3Al and allowing the gamma phase grains of <=100mum diameter and/or the lamella grains to remain at the grain boundaries of the coarse lamella grains and having the excellent cold ductility and high-temp. strength is obtd.

Claims

(JP06145933)

Claims machine translated from Japanese
1. Containing Al of the 42-49% at atomic ratio
The TiAl system which it does, little also I phase and I [2] designates phase as constitution phase
The material which possesses the axial grain organization of the intermetallic and the like, I transformation point
-.alpha. transformation point +30.deg.C to heat keep in the temperature range, diameter 2
In bulky lamella grain and the grain boundary of 00 .micro.m or more diameter 100
The I phase grain of .micro.m or less and/or the organization which remains the lamella grain
That the thermal place of the TiAl based intermetallic which features that it does
Law.
2. Bulky of diameter 200 .micro.m or more, TiAl
It consists of, I phase and Ti [3] it consists of Al, I [2] the lame which consists of phase
To designate [ra] grain organization as subject, in the grain boundary of the said bulky lamella grain diameter 1
The I phase grain of 00 .micro.m or less and/or remaining the lamella grain
Normal temperature ductility and the high temperature which feature that it possesses the organization which becomes it is strong
The TiAl based intermetallic which is superior in degree.

Titanium aluminide base composite material
JP08104933

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  FUJIWARA TSUTOMU
- **International Patent Classification**
  C22C-014/00 C22C-047/00 C22C-049/00 C22C-049/06 C22C-049/11

- **Publication Information**
  JPH08104933 A 1996-04-23 [JP08104933]
- **Priority Details**
  1994JP-0260924 1994-10-03

- **Fampat family**

JPH08104933	A	1996-04-23	[JP08104933]

- **Abstract:**
  (JP08104933)
  PURPOSE: To obtain a heat resistant high strength titanium aluminide base composite material excellent in compatibility of the reinforcing material with the matrix by using tungsten fibers as a reinforcing material and γ-TiAl as a matrix. CONSTITUTION: Tungsten fibers as a reinforcing material are incorporated into γ-TiAl as a matrix preferably by 5-60% to obtain the objective titanium aluminide base composite material. The tungsten fibers are, e.g. fibers contg. ThO2 , HfC, etc., in pure tungsten. The TiAl is an intermetallic compd. Since the tungsten fibers are excellent in compatibility with the γ-TiAl, the objective sound composite material is obtd. by combination.

Claims

(JP08104933)

Claims machine translated from Japanese

1. To designate the tungsten fiber as the reinforcement, the I tie
It features that it becomes TiAl of [pu] as a matrix
[ru] chitanaruminaido basic composite material.

TiAl intermetallic compound-based alloy
JP10130756

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  C22C-001/00 C22C-014/00
- **US Patent Classification**
  PCLO=420418000 PCLX=148421000 PCLX=420421000 PCLX=420588000
- **CPC Code**
  C22C-014/00

- **Publication Information**
  JPH10130756 A 1998-05-19 [JP10130756]
- **Priority Details**
  1996JP-0300792 1996-10-28
  1999US-09301534 1999-04-28

- **Fampat family**

JPH10130756	A	1998-05-19	[JP10130756]
US6294132	B1	2001-09-25	[US6294132]
JP3492118	B2	2004-02-03	[JP3492118]

- **Abstract:**
  (US6294132)
  This invention relates to a TiAl intermetallic compound-based alloy exhibiting excellent heat resistance, oxidation resistance and resonance resistance and having a cast structure composed of fine equiaxed grains. Specifically, it relates to a TiAl intermetallic compound-based alloy comprising of 45 to 48 atomic percent of Al, 5 to 9 atomic percent of Nb, 1 to 2 atomic percent of Cr, 0.2 to 0.5 atomic percent of Si, 0.3 to 2 atomic percent of Ni, 0.01 to 0.05 atomic percent of Y, and the balance being Ti and incidental impurities, the alloy exhibiting excellent heat resistance, oxidation resistance and resonance resistance and having a cast structure formed of fine equiaxed grains.

Claims

(US6294132)

What is claimed is:

1.

A TiAl intermetallic compound-based alloy comprising 45 to 48 atomic percent of Al, 7 up to 8 atomic percent of Nb, 1 to 2 atomic percent of Cr, 0.2 to 0.5 atomic percent of Si, 0.3 to 2 atomic percent of Ni, 0.01 to 0.05 atomic percent of Y, and the balance being Ti and incidental impurities, the alloy exhibiting excellent heat resistance, oxidation resistance and resonance resistance and having a cast structure formed of fine equiaxed grains.

2. The TiAl intermetallic compound-based alloy of claim 1 comprising between about 46 and about 47 atomic percent Al.

3. The TiAl intermetallic compound-based alloy of claim 1 comprising between about 1.2 and about 1.6 atomic percent Cr.

4. The TiAl intermetallic compound-based alloy of claim 1 comprising between about 0.3 and about 0.4 atomic percent Si.

5. The TiAl intermetallic compound-based alloy of claim 1 comprising between about 0.5 and about 1.2 atomic percent Ni.

6. The TiAl intermetallic compound-based alloy of claim 1 comprising between about 0.2 and about 0.4 atomic percent Y.

7. A TiAl intermetallic compound-based alloy comprising between about 46 and about 47 atomic percent Al, 7 up to 8 atomic percent Nb, between about 1.2 and about 1.6 atomic percent Cr, between about 0.3 and about 0.4 atomic percent Si, between about 0.5 and about 1.2 atomic percent Ni, between about 0.2 and about 0.4 atomic percent Y, the balance being Ti and incidental impurities, the alloy having excellent heat resistance, oxidation resistance, and resonance resistance, and having a cast structure formed of fine equiaxed grains.

8. A cast rotating component, said component being formed of a TiAl intermetallic compound-based alloy comprising 45 to 48 atomic percent of Al, 7 up to 8 atomic percent of Nb, 1 to 2 atomic percent of Cr, 0.2 to 0.5 atomic percent of Si, 0.3 to 2 atomic percent of Ni, 0.01 to 0.05 atomic percent of Y, and the balance being Ti and incidental impurities, the alloy exhibiting excellent heat resistance, oxidation resistance and resonance resistance and having a cast structure formed of fine equiaxed grains.

9. The component of claim 8, wherein said component comprises a turbine wheel.

10. The component of claim 9 wherein said turbine wheel is a turbine wheel of a supercharger adapted for use in a passenger car or truck.

11. The component of claim 9 wherein said component comprises a turbine blade.

12. The component of claim 11 wherein said turbine blade is a turbine blade of a supercharger adapted for use in a ship, jet engine, or industrial gas turbine.

13. The cast component of claim 8 wherein said alloy comprises between about 46 and about 47 atomic percent Al, 7 up to 8 atomic percent Nb, between about 1.2 and about 1.6 atomic percent Cr, between about 0.3 and about 0.4 atomic percent Si, between about 0.5 and about 1.2 atomic percent Ni, between about 0.2 and about 0.4 atomic percent Y, the balance being Ti and incidental impurities.

14. The component of claim 13, wherein said component comprises a turbine wheel.

15. The component of claim 13 wherein said turbine wheel is a turbine wheel of a supercharger adapted for use in a passenger car or truck.

16. The component of claim 13 wherein said component comprises a turbine blade.

17. The component of claim 13 wherein said turbine blade is a turbine blade of a supercharger adapted for use in a ship, jet engine, or industrial gas turbine.

Connecting method and connecting part of TiAl alloy component and steel for structure

JP11320132

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
  KYOTANI MICHIO
- **International Patent Classification**
  B23K-020/12 B23K-020/16 B23K-103/24 C22C-014/00 F02B-039/00

- **Publication Information**
  JPH11320132 A 1999-11-24 [JP11320132]
- **Priority Details**
  1998JP-0124780 1998-05-07

- **Fampat family**

JPH11320132	A	1999-11-24	[JP11320132]
JP3453302	B2	2003-10-06	[JP3453302]

- **Abstract:**
  (JP11320132)
  PROBLEM TO BE SOLVED: To improve reliability against a high temperature strength of a joining part by joining a turbine wheel composed of TiAl alloy and a steel shaft, using an alloy as an intermediate member whose thermal expansion coefficient is equivalent to that of the TiAl alloy. SOLUTION: When a steel made shaft 2 is joined with the TiAl alloy made turbine wheel being composed of and including, at an atomic ratio, 45-48% Al, 5-9% Nb, 1-2% Cr, 0.2-0.5% Si, 0.3-2% Ni, 0.01-0.05% Y and, Ti and an avoidable impurity as a balance, an intermediate material 3 composed of an incoloy 903, 907 or 909 is used. A concave part is formed on either one part of the joining faces between the turbine wheel 1 and the intermediate member 3, and a convex part is formed on the other face part. An abrasion welding is then carried out under the condition that the concaved and convexed parts are abutted. The joining face shape is made in a manner that the central part, which being equivalent to 20-70% of cross section diameter being orthogonal to the shaft, is vertical against the shaft and its outer surrounding is slanted by 20-40 deg., preferably 30 deg. from the face vertical against the shaft.

Claims

(JP11320132)

1. TiAl alloy component and steel for structure center
Using the material, in the method of connecting, as a intermediate material Ti
To use the alloy which possesses the coefficent of thermal expansion which is equal to the Al alloy?
On aspect of one side of composition plane of TiAl alloy component and intermediate material
The convex section, to form the concave section on the other surface, the TiAl alloy component
Connecting with the intermediate material the aforementioned convex section was formed the surface and the aforementioned concave section where
When it faces with the surface which was formed with friction welding line
The TiAl alloy component and the steel for structure which feature [u] thing
Connecting method.
2. TiAl alloy component and steel for structure center
Using the material, in the method of connecting, as a 1st intermediate material
The alloy which possesses the coefficent of thermal expansion which is equal to the TiAl alloy is used,
Furthermore the TiAl alloy component and the surface where the 1st intermediate material faces little
Also without, either one to provide the concave section in the central part of the aspect of one side, said concave
The condition which imbedded the 2nd intermediate material which consists of the material whose characteristic is high in the section
Touching, with TiAl alloy component and the aforementioned 1st intermediate material 2nd
In order to make the layer of the intermediate material form, it features that it connects
Connecting method of [ru] TiAl alloy component and steel for structure.
3. In claim 1 or 2 with the method of statement Ti
Connecting with the Al alloy component and the steel for structure, becoming feature
With the connecting part of the TiAl alloy component and the steel for structure which are done.
4. The aforementioned TiAl alloy component [tabinhoi]
It is [ru], the steel for the aforementioned structure being the steel shaft
In the claim 3 which is made feature the connecting part of statement.
5. The aforementioned TiAl alloy component atmoic % with Al:
45-48% and Nb: 5-9% and Cr: 1-2% and S
i: 0.2-0.5% and Ni: 0.3-2% and Y: 0.

To contain the 01-0.05%, the remainder Ti and inevitable non-
It features that it is the TiAl alloy component which consists of pure ones
In claim 3 or 4 connecting part of statement.

TiAl based intermetallic basic alloy
JP09176763

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH09176763 A 1997-07-08 [JP09176763]
- **Priority Details**
  1995JP-0338667 1995-12-26

- **Fampat family**

JPH09176763	A	1997-07-08	[JP09176763]
JP3388970	B2	2003-03-24	[JP3388970]

- **Abstract:**

(JP09176763)
PROBLEM TO BE SOLVED: To produce a Ti-Al intermetallic compound matrix alloy excellent in cold ductility, heat resistance, oxidation resistance and resonance resistance by specifying the compsn. composed of Al, Mo, Ni, Nb, C, Mn and Ti. SOLUTION: This Ti-Al intermetallic compound matrix alloy is the one contg., by atom, 45 to 48% Al, 0.5 to 3% Mo and/or Ni, 5 to 9% Nb, 0.1 to 0.5% C, 1 to 2% Mn, and the balance Ti with inevitable impurities, excellent in high temp. strength, oxidation resistance, cold ductility or the like and furthermore improved in resonance resistance. This material characteristics can be obtd. by the addition of suitable amounts of C, Mn and Nb, and the inside friction is improved by the addition of a suitable amt. of Mo or Ni to obtain the damping capacity of vibration.

Claims

(JP09176763)

1. Al density: 45-48 atmoic %, Mo and
/Or Ni density: 0.5-3 atmoic %, Nb density: 5-9
Atmoic % C density: 0.1-0.5 atmoic %, Mn density: 1
The -2 atmoic % to contain, the remainder Ti and the inevitable impurity?
And others heat resistance, the oxidation resistance and the resistance resonance characteristic T which feature that it becomes iAl based intermetallic basic alloy.

TiAl based intermetallic basic alloy

JP09143599

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  C22C-014/00 C22C-021/00

- **Publication Information**
  JPH09143599 A 1997-06-03 [JP09143599]
- **Priority Details**
  1995JP-0296410 1995-11-15

- **Fampat family**

JPH09143599	A	1997-06-03	[JP09143599]
JP3388965	B2	2003-03-24	[JP3388965]

- **Abstract:**

(JP09143599)
PROBLEM TO BE SOLVED: To improve the resistance to heat and resonance, particularly resonance characteristic, that is, damping capacity, of a TiAl intermetallic compound base alloy by specifying the composition of this alloy and to apply this alloy to aerospace and aircraft structural materials or rotating parts by utilizing its light weight characteristic and high strength. SOLUTION: An alloy, having a composition consisting of, by atomic weight ratio, 45-48% Al, 0.5-2% Ni, 1-3% Nb, 0.2-1% W, 1-2% Mn, and the balance Ti, is used. This alloy is cast into ingot by using alloying elements, such as high purity Ti of about 99.9% purity and Al, as raw materials by means of high-frequency skull melting. Then, the ingot is subjected to homogenizing treatment at 1000 deg.C for 10hr and machined into desired product shape. By this method, material characteristics of >=1.7% elongation at room temp., >=47kgf/mm<2> tensile strength at 750 deg.C, >=1.11×10<-3> Q<-1> internal friction at room temp., and <=12.6g/cm<3> oxidation increase at holding at 750 deg.C for 500hr can be obtained.

Claims

(JP09143599)

1. Al density: The 45-48 atmoic %, Ni it is dense
Degree: 0.5-2 atmoic %, Nb density: The 1-3 atmoic %, W it is dense
Degree: 0.2-1 atmoic %, Mn density: The 1-2 atmoic % it contains
It does, also heat resistance and the resistance which feature that the remainder consists of Ti
Swing characteristic TiAl based intermetallic basic alloy.

Heat treatment method of TiAl based intermetallic
JP08291378

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  YAMADA TAKESHI
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH08291378 A 1996-11-05 [JP08291378]
- **Priority Details**
  1995JP-0115262 1995-04-18

- **Fampat family**

JPH08291378	A	1996-11-05	[JP08291378]
JP2862494	B2	1999-03-03	[JP2862494]

- **Abstract:**
  (JP08291378)
  PURPOSE: To improve the cold ductility of an intermetallic compound without detecting its high temp. strength by forming fine γphase grains, α2 phase grains and lamellar grains around the coarse lamellar grains of a Ti-Al intermetallic compound contg. a specified amt. of Al. CONSTITUTION: This Ti-Al intermetallic compound is the one contg., by atom, 41 to 49% Al and having a lamellar-grained structure at least consisting of γphases (Ti-Al) and α2 phases (Ti3 Al) as constituting phases. A Ti-Al intermetallic compound is held under heating to the transformation point or above to form its structure into a lamellar-grained one having desired grain diameter. It is held under heating to an α+γ region to form a structure contg. at least one among relatively fine γ phase grains, α2 phase grains and lamellar grains around coarse lamellar grains. The coarse lamellar grains reduce the grain boundaries to improve its high temp. strength. Stress concentration on the phase boundaries in the vicinity of the grain boundaries is relaxed by the deformation of the fine grains, so that its ductility at an ordinary temp. improves.

Claims

(JP08291378)

1. Containing Al of the 41-49% at atomic ratio
To do, at least I phase (TiAl) and I [2] phase (Ti [3] A
l) The TiAl gold which possesses the lamella grain organization which is made constitution phase
Intergeneric chemical compound, from eutectoid temperature to I transformation point in temperature range
Heating keeping in certain .alpha.+.gamma. limits, it compares around the bulky lamella grain
The comparison minute I phase grain, I [2] inside the phase grain and the lamella grain it is little
Also the [ku] TiAl which features that it makes the organization which includes one
Heat treatment method of type intermetallic.

SiC fiber-reinforced TiAl composite material
JP06192818

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  FUJIWARA TSUTOMU
- **International Patent Classification**
  C22C-047/00 C22C-047/02 C22C-049/12 C23C-014/06 C23C-014/18

- **Publication Information**
  JPH06192818 **A 1994-07-12 [JP06192818]**
- **Priority Details**
  1992JP-0357839 1992-12-25

- **Fampat family**

JPH06192818	A	1994-07-12	[JP06192818]
JP2941589	B2	1999-08-25	[JP2941589]

- **Abstract:**
  (JP06192818)
  PURPOSE:To obtain a defectless composite material free from crack by compositely molding a SiC fiber coated with a specific metal and a Ti-Al based intermetallic compound to suppress the interface reaction in between. CONSTITUTION:The surface of the SiC fiber produced by CVD method is coated by vapor depositing one or more kinds of a group of Hf, Zr and Ta. The reinforcing SiC fiber and the Ti-Al based intermetallic compound of a matrix are composited and molded. Because Hf, Zr or Ta applied on the surface of the SiC fiber suppresses the excess interface reaction between the intermetallic compound and carbon on the surface of the SiC fiber, the generation of crack in the composite material is prevented.

Claims

(JP06192818)

Claims machine translated from Japanese
1. Among the groups which consist of Hf, Zr and Ta
The SiC fiber for strengthening which the metal of 1 kinds or more coating is done
The TiAl based intermetallic which is the matrix compound transformation
Shape doing, the SiC fiber reinforcement TiAl which features that it becomes double
Plied timber charge.

TiAl basic heat resistant alloy

JP01312048

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  FUJITA AKIJI
  TAKEDA YORIMASA
  KAWANAMI SHIZUO
  MATSUMOTO TATSUYOSHI
  KUKIDA HIROYUKI
  MATSUDAIRA NOBUYASU
- **International Patent Classification**
  C22C-014/00

- **Publication Information**
  JPH01312048 A 1989-12-15 [JP01312048]
- **Priority Details**
  1988JP-0142426 1988-06-09

- **Fampat family**

JPH01312048	A	1989-12-15	[JP01312048]
JPH079047	B2	1995-02-01	[JP95009047]
JP1980232	C	1995-10-17	[JP1980232]

- **Abstract:**

(JP95009047)
PURPOSE: To obtain a lightweight TiAl-base heat-resistant alloy having excellent ductility and specific strength by specifying the compsn. consisting of Al, V, Ta and Ti. CONSTITUTION: The TiAl-base heat-resistant alloy having ductility and specific strength is constituted of, by atom, 43-50% Al, 0.5-2% V, 0.5-3% Ta and the balance substantial Ti. The alloy is most suitable as a lightweight and high strength material particularly having cold ductility and as a structural member in the place where heat resistance is required. In the above alloy, specific amounts of V and Ta are added in the Al-lean side to 50% Al of a Ti-Al alloy to fine the structure and to provide excellent various characteristics. COPYRIGHT: (C)1989,JPO&Japio

Claims

(JP95009047)

Claims machine translated from Japanese
1. At atomic percentage Al: 43-50%, V: 0.5-2
% Ta:
-0.5-3% with remainder substance to Ti from become thing special
The TiAl basic heat resistant alloy which is superior in ductile specific intensity as a collection/symbol.

TiAl INTERMETALLIC COMPOUND BASE ALLOY, ITS PRODUCTION, TURBINE MEMBER AND ITS PRODUCTION

JP2000199025

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
  KYOTANI MICHIO
- **International Patent Classification**
  C22C-014/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JP2000199025 A 2000-07-18 [JP2000199025]
- **Priority Details**
  1999JP-0000675 1999-01-05

- **Fampat family**

JP2000199025	A	2000-07-18	[JP2000199025]

- **Abstract:**
  (JP2000199025)
  PROBLEM TO BE SOLVED: To provide a TiAl intermetallic compd. base alloy having oxidation resistance, high temp. strength, toughness and ductility capable of sufficiently corresponding to practical use. SOLUTION: This alloy has a compsn. by weight, 44.5 to 48.5% Al, 5 to 9.5% Nb, 0.5 to 2% Cr, 0.1 to 0.4% Si, 0.1 to 0.4% Ni, and the balance Ti with inevitable impurities and a two phase structure of a lamellar structure composed of a γ-TiAl phase and an α2-Ti3Al phase and a γ phase or a three phase structure of a lamellar structure, a γ-TiAl phase and a β phase.

Claims

(JP2000199025)

Claims machine translated from Japanese
1. Atmoic % With, Al: 44.5-48.5
% Nb: 5-9.5% and Cr: 0.5-2% and Si:
0.1-0.4% and Ni: 0.1-0.4% and remainder failure
*** To possess the mark impurity and the constitution which consists of Ti, .gamma.-TiA
l phase and I [2] - Ti [3] the lame Ra organization which consists of Al phase I
2 phase organization or lame Ra organization and .gamma.-TiAl phase of phase
TiAl which features that it possesses 3 phase organization of calling I phase
Type intermetallic basic alloy.
2. .Gamma.-TiAl phase and I [2] - Ti [3] Al phase?
And others in the claim 1 which is formed mainly with the lame Ra organization which becomes statement
TiAl based intermetallic basic alloy.
3. .Gamma.-TiAl phase and I [2] - Ti [3] Al phase?
And others mean diameter of the lame Ra organization which becomes 300 .micro.m or less, a
The [ri], adjoins I [2] - Ti [3] average of interval of Al phase 2 .micro.m from here
In the claim 2 which is under the TiAl based intermetallic basis of statement go
Gold.
4. As the impurity, oxygen content 1000pp
In either of the claim 1-3 which is m or less TiAl of statement
Type intermetallic basic alloy.
5. TiAl based intermetallic basic alloy casting combination
In either of the claim 1-4 which is the gold the TiAl gold of statement
Intergeneric chemical compound basic alloy.
6. Atmoic % With, Al: 44.5-48.5
% Nb: 5-9.5% and Cr: 0.5-2% and Si:
0.1-0.4% and Ni: 0.1-0.4% and remainder failure
*** Casting the mark impurity and the alloy *** hot water which consists of Ti, it casts
Process and aforementioned casting ones which obtain the thing the 1300-1400.deg.C warm
At the degree range it heats keeps of 10 minutes or more process, it heats keeps
The process which administers rear sudden cooling processing, with T which features that it consists of
Production method of iAl based intermetallic basic alloy.
7. In casting ones which are obtained high-temperature gravitational pressure press processing
After administering in the claim 6 which it heats keeps, TiAl system of statement
Production method of intermetallic basic alloy.
8. Heating retention process under non oxidation characteristic atmosphere line
The receiving which is, does sudden cooling processing with the introduction and agitation of the inert gas
In seeking section 6 or 7 TiAl based intermetallic basic alloy of statement
Production method.
9. As for sudden cooling processing, from heating retention temperature 1000
.deg.C To the claim which is done at the cooling rate of 20-500.deg.C/min
In either of section 6-8 TiAl based intermetallic basis of statement
Production method of alloy.
10. Atmoic % With, Al: 44.5-48.5
% Nb: 5-9.5% and Cr: 0.5-2% and Si:
0.1-0.4% and Ni: 0.1-0.4% and remainder failure
*** To possess the mark impurity and the constitution which consists of Ti, .gamma.-TiA
l phase and I [2] - Ti [3] lame Ra organization and .gamma.- which consist of Al phase
2 phase organization or lame Ra organization and .gamma.-Ti of TiAl phase
It features that it possesses 3 phase organization of Al phase and I phase
Being constituted from the TiAl based intermetallic basic alloy special
The turbine component which is made collection/symbol.
11. .Gamma.-TiAl phase and I [2] - Ti [3] Al phase
In the claim 10 which is formed mainly with the lame Ra organization which consists of description
Turbine component of *** .
12. Atmoic % With, Al: 44.5-48.5
% Nb: 5-9.5% and Cr: 0.5-2% and Si:
0.1-0.4% and Ni: 0.1-0.4% and remainder failure
*** Casting the mark impurity and the alloy *** hot water which consists of Ti, the tar
Process and the aforementioned turbine wheel element which obtain the bottle wheel material
Material in temperature range of 1300-1400.deg.C heating 10 minutes or more
You keep after process, heating keeping the process which administers sudden cooling processing, with
Production method of the turbine component which features that it consists of.
13. In the turbine wheel material which is obtained the heat

After administering gravitational pressure press processing the claim 12 which it heats keeps,
Production method of turbine component of statement.
14. Heating retention process under non oxidation characteristic atmosphere line
The receiving which is, does sudden cooling processing with the introduction and agitation of the inert gas
In seeking section 12 or 13 production method of turbine component of statement.
15. As for sudden cooling processing, from heating retention temperature 100
The receiving which does to the 0.deg.C at the cooling rate of 20-500.deg.C/min
In either of seeking section 12-14 production of turbine component of statement
Method.
16. .Gamma.-TiAl phase and I [2] - Ti [3] Al phase
2 phase organization of lame Ra organization and the .gamma.-TiAl phase which consist of, the [ma]
It is 3 phase group of lame Ra organization, .gamma.-TiAl phase and I phase
With weaving, forms main phase mean diameter of the aforementioned lame Ra organization which 300
It is .micro.m or less, it adjoins at the time of this lame Ra organizing I
[2] - Ti [3] average interval of Al phase being 2 .micro.m or less special
The TiAl based intermetallic basic casting alloy which is made collection/symbol.

Method for joining tial intermetallic compound and mo alloy
JP06023569

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  FUKUSHIMA AKIRA
  FUJIWARA TSUTOMU

- **International Patent Classification**
  B23K-020/00 C22C-014/00 C22C-027/04

- **Publication Information**
  JPH0623569 **A 1994-02-01 [JP06023569]**
- **Priority Details**
  1992JP-0204274 1992-07-09

- **Fampat family**

JPH0623569	A	1994-02-01	[JP06023569]

- **Abstract:**
  (JP06023569)
  PURPOSE: To join a TiAl intermetallic compd. and an Mo alloy with high strength by subjecting this compd. and this alloy to diffusion joining by using metal Ti as an insert material. CONSTITUTION: The metal Ti is used as the insert material 3 at the time of diffusion joining of the TiAl intermetallic compd. 1 and the Mo alloy 2. The preferable thickness of the metal Ti at the time of joining is 20 to 50.mu.m, the temp. and the pressure and time at the time of joining are 950 deg.C, 100kgf/cm(sup 2) and 120 minute. The high-strength joining of the TiAl intermetallic compd. 1 and the Mo alloy 2 which are heretofore not possible is feasible. The parts having the excellent characteristics by the composite structure of the Mo alloy having excellent heat resistance and erosion resistance and the TiAl which is the lightweight and heat resistant intermetallic compd. are thus produced. COPYRIGHT: (C)1994,JPO&Japio

Claims

(JP06023569)

Claims machine translated from Japanese
1. Making use of metal Ti as the insertion material,
Spreading connecting the TiAl intermetallic and the Mo alloy
Connecting method of the TiAl intermetallic and the Mo alloy which are made feature.

JOINING METHOD FOR TiAL-BASE ALLOY AND STEEL PRODUCT
JP2004090130

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  B23P-011/02 F01D-005/28 F01D-025/00 F02B-039/00 F02C-007/00

- **Publication Information**
  JP2004090130 A 2004-03-25 [JP2004090130]
- **Priority Details**
  2002JP-0252810 2002-08-30

- **Fampat family**

JP2004090130	A	2004-03-25	[JP2004090130]

- **Abstract:**
  (JP2004090130)
  PROBLEM TO BE SOLVED: To provide a low-cost and simple joining method, which directly joins a TiAl-base alloy and a steel product for realizing the improvement in transient response characteristic of a light and small supercharger, elevation of a turbine inlet temperature and high speed rotation, and is excellent in high temperature strength suitable for use at a high temperature. SOLUTION: This joining method for the TiAl-base alloy and the steel product, includes the steps of: heating a turbine wheel 1 provided with a recessed joining part 3 and made of a TiAl-base alloy member, cooling a shaft 2 provided with a projecting joining part 4 and made of a steel product member, or performing both of the above to give a temperature difference to both members; and pushing the projecting joining part 4 in the recessed joining part 3 and the returning the temperature to an ordinary temperature. COPYRIGHT: (C)2004,JPO

Claims

(JP2004090130)

1. By heating the TiAl basic alloy component where it can provide the concave condition joint, or, the step which gives temperature difference to the said TiAl basic alloy component and the said steel component by doing these both by cooling the steel component where it can provide the convex condition joint, or, and,

The step which pushes in the said convex condition joint, into the said concave condition joint

Connecting method of the TiAl basic alloy and the steel which are included.
2. In the claim 1 where the aforementioned temperature difference is the 400-1200.deg.C method of statement.
3. In order to provide the spine in the aforementioned convex condition joint, to fit to the said spine in the claim 1 which features that the groove is provided in the aforementioned concave condition bond section or 2 method of statement.
4. With the steel component where it can provide the concave condition joint and connecting method of the TiAl basic alloy and the steel which include the step which pushes in the said convex condition joint, into the said concave condition joint the TiAl basic alloy component where it can provide the convex condition joint by turning relatively.
5. The aforementioned revolution, in the claim 4 which is 2000-3000rpm method of statement.
6. In the claim 4 which features that the spine is provided in the aforementioned convex condition joint or 5 method of statement.
7. The aforementioned TiAl basic alloy component is the turbine wheel of the turbine, in either of the claim 1-6 where the aforementioned steel component is the shaft of the turbine method of statement.

OXIDATION RESISTANCE COATING FOR TiAl-BASED ALLOY
JP2002053976

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
  TOKUNAGA KIKUO
- **International Patent Classification**
  C23C-022/54 C23C-022/56 C23C-022/82 F01D-005/28

- **Publication Information**
  JP2002053976 A 2002-02-19 [JP2002053976]
- **Priority Details**
  2000JP-0239028 2000-08-07

- **Fampat family**

JP2002053976	A	2002-02-19	[JP2002053976]

- **Abstract:**
  (JP2002053976)
  PROBLEM TO BE SOLVED: To provide a method for depositing a stable aluminum oxidized film on the surface or in the vicinity of the surface of a TiAl-based alloy and to impart practically high oxidation resistance thereto at a low cost. SOLUTION: A film of an oxidation resistance imparting agent composed of at least one kind of compound selected from among the oxides, hydroxides, carbonates and bicarbonates of Be, Mg, Ca, Sr and Ba or a continuous body of granular material is deposited on the surface of a TiAl-based alloy, and heat treatment is applied in the air.

Claims

(JP2002053976)

1. Be, Mg, Ca, Sr or Ba
Oxide and hydroxide, carbonate, or from bicarbonate selection
The [re] ru the acid proof conversion grant medicine which at least consists of the chemical compound of 1 types
Continuum of membrane, or granular ones on TiAl basic alloy surface
TiA which features that it forms, it heat-treats in the atmosphere
Acid proof conversion coating method of l basic alloy.
2. The aforementioned acid proof conversion grant medicine alumina acid soda it is young
It does and it mixes the [ku] with the binder which consists of the aqueous solution of the water glass,
On the TiAl basic alloy surface it applies, dries and heat-treats in the atmosphere
The resistance of the TiAl basic alloy of the claim 1 statement which features [ru] thing
Oxidation coating method.
3. The aforementioned acid proof conversion grant medicine and binder and linear expansion
To mix with the ratio manufacturing medicine and apply on the TiAl basic alloy surface, drying
It does and the claim 1 which features that it heat-treats in the atmosphere young it does, the [ku]
Acid proof conversion coating method of TiAl basic alloy of 2 statements.
4. The description above after the heat treatment, the aforementioned acid proof conversion grant medicine content skin
Continuum of membrane or granular ones, on the said TiAl basic alloy surface
From the claim 1 which features that it exfoliates or 3 in each case?
Acid proof conversion coating method of TiAl basic alloy of section statement.
5. On the aforementioned TiAl basic alloy surface natural gas
The TiAl wheel chart for the microphone logger star bottle which is made the fuel
The claim 1 which features that it is on the surface or 4 in each case
Acid proof conversion coating method of TiAl basic alloy of section statement.

Ti-al base intermetallic compound matrix alloy
JP09176764

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  C22C-014/00 F01D-005/02 F01D-005/28

- **Publication Information**
  JPH09176764 A 1997-07-08 [JP09176764]
- **Priority Details**
  1995JP-0336675 1995-12-25

- **Fampat family**

JPH09176764	A	1997-07-08	[JP09176764]

- **Abstract:**
  (JP09176764)
  PROBLEM TO BE SOLVED: To produce a heat resistant high strength and oxidation resistant Ti-Al base intermetallic compound matrix alloy good in the balance of characteristics such as cold ductility, high temp. strength, creep properties and oxidation resistance. SOLUTION: This alloy is composed of, by weight, 29 to 30.5% Al concn., 13.5 to 17.4% Nb concn., 1.3 to 2.4% Cr concn., 0.9 to 2.5% Ta concn., 0.1 to 0.2% Si concn., 0.01 to 0.05% N concn., and the balance Ti.

Claims

(JP09176764)

1. Al density: 29-30.5 weight %, Nb
Density: 13.5-17.4 weight %, Cr density: 1.3-
2.4 weight %, Ta density: 0.9-2.5 weight %, Si
Density: 0.1-0.2 weight %, N density: 0.01-0.

05 weight % it contains, the remainder consisting of Ti feature
Heatproof high intensity it does, the oxidation resistance TiAl based intermetallic basis go
Gold.

Silicon carbide series fiber-reinforced titanium-alum. series intermetallic compound composite material

JP10265869

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  FUJIWARA TSUTOMU
- **International Patent Classification**
  C01B-031/36 C22C-014/00 C22C-047/00 C22C-047/02 C22C-047/04 C22C-049/12 D01F-009/08

- **Publication Information**
  JPH10265869 A 1998-10-06 [JP10265869]
- **Priority Details**
  1997JP-0073324 1997-03-26

- **Fampat family**

JPH10265869	A	1998-10-06	[JP10265869]

- **Abstract:**
  (JP10265869)
  PROBLEM TO BE SOLVED: To improve an SiC series fiber/TiAl composite material, on the boundary between SiC series fiber and a matrix, by forming a carbon layer and a tungsten layer from the fiber side. SOLUTION: As for the formation of the carbon layer and the tungsten layer, before the fiber and matrix are compounded, as coating, they are formed on the surface of the fiber. As coating forming means, CVD, PVD, thermal spraying, plating or the like can be adopted. In this case, at first, the carbon layer is formed to prevent the damage from the outside in the fiber, and on the surface of the carbon layer, the tungsten layer preventing its excessive reaction with the matrix. In this way, the carbon layer and tungsten layer on the surface of the fiber suppress the excessive reaction between the fiber and TiAl matrix and furthermore prevent the physical damage of the fiber, by which cracks which have been generated in the conventional compounded preformed body can be prevented. COPYRIGHT: (C)1998,JPO

Claims

(JP10265869)

Claims machine translated from Japanese
1. To designate the SiC fiber as the strengthening fiber, TiAl
With the composite material which designates the type intermetallic as the matrix oh
[te], in the said fiber and boundary of matrix from fiber side carbon
It features that layer and tungsten layer are formed
SiC based fiber-reinforced TiAl based intermetallic composite material.

Ti-al intermetallic compound base alloy
JP10060564

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  C22C-014/00 C22F-001/18

- **Publication Information**
  JPH1060564 **A 1998-03-03 [JP10060564]**
- **Priority Details**
  1996JP-0223514 1996-08-26

- **Fampat family**

JPH1060564	A	1998-03-03	[JP10060564]

- **Abstract:**
  (JP10060564)
  PROBLEM TO BE SOLVED: To impart material characteristics of being usable as-cast to an alloy, at the time of mass-producing supercharger compact rotary parts for various engines by lost wax precision casting, by specifying the compsn. of a Ti-Al intermetallic compound base alloy to be used. SOLUTION: The compsn. of an alloy is composed of the one contg., by atom, 45 to 48% Al concn., 0.5 to 2% Co concn., 1 to 2% Cr concn., 0.3 to 0.8% Ta concn, 5 to 9% Nb concn., and the balance Ti with inevitable impurities. As the results of material testing as for the products with 100mm diameter obtd. by subjecting the alloy having the compsn. using Ti, Al, Co, Cr, Ta and Nb as raw materials to melting by high frequency skull melting in an Ar atmosphere, and executing casting, 1.0% room temp. elongation, >=53kgf/mm<2> 800 deg.C tensile strength and <=2.3g/cm<2> increase to be oxidized at 800 deg.C for 500hr have been shown, and in this alloy, material characteristics such as excellent high temp. strength, oxidation resistance and cold elongation can be obtd. as-cast.

Claims

(JP10060564)

1. Al density: The 45-48 atmoic %, Co it is dense
Degree: 0.5-2 atmoic %, Cr density: 1-2 atmoic %, Ta
Density: 0.3-0.8 atmoic %, Nb density: 5-9 atmoic %
It contains, the remainder consists of Ti and the inevitable impurity
It is superior in heat resistance and the oxidation resistance which are featured, while it is casting use
The TiAl intermetallic basic alloy whose it is possible to do.

Titanium aluminum base alloy and its production
JP07197154

- **Patent Assignee**
  MITSUBISHI HEAVY INDUSTRIES
- **Inventor**
  TETSUI TOSHIMITSU
- **International Patent Classification**
  C22C-001/00 C22C-014/00 C22C-021/00 C22F-001/00 C22F-001/18

- **Publication Information**
  JPH07197154 A 1995-08-01 [JP07197154]
- **Priority Details**
  1994JP-0012056 1994-01-10

- **Fampat family**

JPH07197154	A	1995-08-01	[JP07197154]

- **Abstract:**
  (JP07197154)
  PURPOSE: To produce a Ti-Al base intermetallic compound base alloy excellent in plastic workability and having a resistance to oxidation at high temp. and to provide a producing method thereof. CONSTITUTION: (1) This alloy containing 42-48atom% Ti, 44-47atom% Al, 6-10atom% Nb and 1.5-3.5atom% Cr and being composed by dispersing a fine .beta.phase in a .gamma. phase is prepared. (2) This alloy is produced by dissolving and casting the alloy containing 42-48atom% Ti, 44-47atom% Al, 6-10atom% Nb and 1.5-3.5atom% Cr, then, heat-treating it within the range of 1130-1250 deg.C. COPYRIGHT: (C)1995,JPO

Claims

(JP07197154)

1. Ti density: The 42-48 atmoic %, Al it is dense
Degree: 44-47 atmoic %, Nb density: 6-10 atmoic %, C
r density: The 1.5-3.5 atmoic % to contain, in I phase minuteness
I Phase dispersing, in the plastic processability which features that it becomes superior
The [re] it is the hot oxidation resistance TiAl based intermetallic basic alloy.
2. Ti density: The 42-48 atmoic %, Al it is dense
Degree: 44-47 atmoic %, Nb density: 6-10 atmoic %, C
r density: The 1.5-3.5 atmoic % melting the alloy which is contained,
After the casting, heat treatment in the range of the 1130-1230.deg.C, it is dense
With the hot oxidation resistance TiA which is superior in the plastic processability which is featured
Manufacturing method of I based intermetallic basic alloy.