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Method for preparing TiAl-based alloy formwork by wax mold casting
CN101462150

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- **Abstract:**
  (CN101462150)
  The invention relates to the field of precision casting, in particular to a method for preparing a shuttering for an investment casting TiAl-based alloy with low cost and strong stability. The method comprises the following steps: preparing slurry of which flow cup viscosity is 10 to 25 seconds from Y2O3 powder of 200 to 400 meshes on granularity and silica sol according to a weight ratio of 2:1-3:1; then, coating the slurry on a wax mould, sprinkling electric melting Y2O3 sand of which sand granularity is 40 to 100 meshes on the wax mould, and drying the wax mould; preparing slurry of which flow cup viscosity is 10 to 30 seconds by adopting Al2O3 powder of 200 to 400 meshes on granularity and silica sol according to a weight ratio of 3:1-4:1, coating the second layer, sprinkling electric melting Al2O3 sand of which sand granularity is 40 to 80 meshes on the wax mould, and drying the wax mould; preparing slurry by adopting bauxite and silica sol according to a weight ratio of 3:1-4:1,and sprinkling coal gangue sand of which sand granularity is 16 to 24 meshes on the wax mould; after three layers, finally hanging the bauxite slurry, and drying the slurry; and then removing wax, and sintering the mould. The method has the advantages of simple shuttering preparation process and low cost of the shuttering, can effectively control reaction of a TiAl-based alloy cast and a shuttering surface material, reduce oxygen feeding amount of the alloy, and is suitable for casting a TiAl-based alloy cast.

Claims

(CN101462150)

1. One process for the preparation of a mold shell investment casting TiAl-based alloy, characterized in the following steps:
1) a particle size of 200-400 mesh Y2O3 powder and the weight ratio of 2:1 silica sol-3:1 configuration having a viscosity of a flow cup 10-25 seconds of the slurry;
2) will be hooked to the wax slurry coating, sanding particle size of 40-100 mesh electrofused Y2O3 sand, dried; using 200-400 purpose Al2O3 powder and the silica sol in a weight ratio 3:1-configured 4:1 a flow cup viscosity of 10-30 seconds of the slurry, 2nd layer hung coated, sprinkled 40-80 mesh size of the electro-cast Al2O3 sand, dried; weight ratio of 3:1 with silica sol and alumina was used-slurry configured 4:1, sanding particle size of 16-24 purpose gangue abrasive grits; after 3 layer, bauxite slurry last hang times, dried;
3) de-waxing, sintering.

2. TiAl based alloy according to claim 1 investment casting process for the preparation of the same formwork, characterized in: step 1), wetting agent added during slurry preparation, an antifoaming agent, wherein the wetting agent comprises by weight of the slurry 1-5 ‰, anti-foaming agent accounts for a percentage by weight of the slurry 1-5 ‰, silica sol was added under stirring Y2O3 powder, followed by a series of wetting agents, defoamers, stirred for 10 hours or more, is able coating.

3. TiAl based alloy according to claim 1 investment casting process for the preparation of the same formwork, characterized in: wetting agent is a polyoxyethylene alkyl phenol ether, low foaming wetting dispersant RFCF-10 or octylphenol ethoxylate; an antifoaming agent is isopropyl alcohol, silicone or xu positive alcohol.

4. TiAl based alloy according to claim 1 investment casting process for the preparation of the same formwork, characterized in: step 2), wax module immersed in a viscosity cup having a viscosity of 10-30 seconds of Y2O3 slurry 3-8 seconds, ensuring that the wax model hung uniform slurry, sanding particle size of 40-100 destination Y2O3 sand, a temperature of 20-25 °C, humidity 30 -70% 8 hours or more to dry in an environment, forming a top ply; using 200-400 purpose Al2O3 powder and the silica sol in a weight ratio 3:1-configured 4:1 a flow cup viscosity of 10-30 seconds of the slurry, 2nd layer coating hanging, sprinkled 40-80 mesh size of the electro-cast Al2O3 sand, at a temperature of 20-25 °C, humidity 30-60% in an environment 10 hours or longer to dry, forming a tie; bauxite slurry was then used, viscosity cup having a viscosity of 10-20 seconds, sanding particle size of 16-24 purposes as coal gangue sand, coating 3-5 layers, each layer is at a temperature of 20-25 °C, humidity 30-60% of the dried 12 hours or more in the environment, forming the stabilizing layer; hung bauxite slurry coating final layer, at a temperature of 20-25 °C, humidity 30-60% and dried in an environment of 10 hours or more.

5. TiAl based alloy according to claim 4 investment casting process for the preparation of the same formwork, characterized in: the stabilizing layer and the last slurry was set to 200-400-mesh bauxite powder with silica sol and a weight ratio of 3:1-configured 4:1.

6. TiAl based alloy according to claim 1 investment casting process for the preparation of the same formwork, characterized in: Y2O3 powders are sintered, Y2O3 sand is a fused state.

7. TiAl based alloy according to claim 1 investment casting process for the preparation of the same formwork, characterized in: step 3), formed of the same formwork after dewaxing at room temperature for 4-10 hours followed by sintering, sintering at a temperature of 800-1200 °C, incubated for 1-3 hours, furnace cooled to 300 °C or less that is removable.

Preparing method of Gamma-TiAl base alloy shell mould by investment casting CN1541786

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- **Fampat family**

CN1541786	A	2004-11-03	[CN1541786]
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- **Abstract:**

(CN1541786)
The present invention relates to precision casting technology, and is especially investment pattern casting process of gamma-TiAl base alloy shuttering. First, corundum powder of 200-400 mesh and organic sol in weight ratio of 3.0-4.0 are compounded into slurry of efflux cup viscosity in 10-40 sec; then, the slurry is coated to wax pattern and corundum powder of 16-100 mesh is spread and dried; the said steps are repeated for seven or eight times; and finally the investment pattern is dewaxed and sintered. The investment pattern casting process is simple, easy to control, high in inner surface quality of the investment pattern and moderate in strength, and may be used in producing casting with smooth surface and no obvious reaction layer. The present invention is suitable for casing gamma-TiAl base alloy up to the requirement of precision cast gamma-TiAl base alloy structural member.

Claims

(CN1541786)

1. One investment casting -TiAl based alloy modification of production method, characterized in the following steps:
1) a particle size of 200-400 weight ratio of organosol object with corundum powder 3.0: 1-4.0: 1 formulated as a flow cup viscosity of 10-40 seconds of the slurry;
2) will be hooked to the wax slurry coating, spraying particle size of 100-16 mesh emery, dried; so forth 7-8 times, a final layer of coating is hung slurry, drying;
3) de-waxing, sintering.

2. In accordance with claim 1 investment cast -TiAl based alloy modification of production method, characterized in: step 1) added during slurry preparation active agent, an antifoaming agent, wherein the surfactant is present in weight percentage of the slurry for 1-5 ‰, a defoaming agent of the slurry are weight percentages are 1-3 ‰, in a stirred state with the active agent is added to the organic sol of the alumina powder, followed by defoaming agent, was stirred for 5 hours or more, then placed 4-12 hours.

3. In accordance with claim 1 investment cast -TiAl based alloy modification of production method, characterized in: step 2) dipped in wax module flow cup viscosity of 30-40 seconds of the slurry 3-6 seconds, scattered particle size of 100-65 mesh emery, dried at room temperature 10-15 hours, the operation is repeated 2nd layer, forming a top ply; hung followed by application of 3rd-7 Layer Paste, having a viscosity of slurry flow cup 10-30 seconds, after application of each layer hangs sprinkled particle size of 45-16 mesh emery, dried at room temperature 20-30 hours, forming the stabilizing layer; hang flow cup final layer coating having a viscosity of 10-30 seconds of slurry, room temperature drying time 40-60 hours.

4. In accordance with claim 3 investment cast -TiAl based alloy modification of production method, characterized in: reinforcing Layer Paste as corundum powder with silica sol and at 3.0: 1-4.0: 1 formulated.

5. In accordance with claim 3 investment cast -TiAl based alloy modification of production method, characterized in: last layer slurry as corundum powder with silica sol and at 3.0: 11-4.0: 1 formulated.

6. In accordance with claim 1 investment cast -TiAl based alloy modification of production method, characterized in: pouring knot state or molten state as a corundum powder.

7. In accordance with claim 1 investment cast -TiAl based alloy modification of production method, characterized in: binder is a transition element oxide organic sol, Ti, Zr, Th organosol of the organometallic compound of a transition element or rare earth element of the organosol, flow cup viscosity of 10-30 seconds.

8. In accordance with claim 1 investment cast -TiAl based alloy modification of production method, characterized in: step 3) formed of the same formwork after dew axed at room temperature for 4-10 hours followed by sintering, a sintering temperature is 600-1000 °C, incubated for 1-4 hours, cooled to room temperature.

Method for semi-continuously preparing TiAl base alloy automobile air valve and components with similar shape

CN101121196

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CN101121196	A	2008-02-13	[CN101121196]
CN100457328	C	2009-02-04	[CN100457328C]

- **Abstract:**
  (CN101121196)
  Questel Machine translated AbstractThis invention involves the preparation technology of automobile air valve and close shape part, to be specific is one-and-a-half kinds prepares the method of TiAl base alloy automobile air valve and close shape part continuously. After using Banlian continues the vacuum suction mold stove induction melting, vacuum suction mold method: Takes other sponge titanium, the industry pure aluminum and alloying elements as the raw material, uses the CaO formation the clay crucible to carry on the vacuum induction melting; The casting shell is constituted by the air valve and other part form, the middle flow table and suction mold tube, air valve part's length direction and middle flow table vertical uniform distribution; The vacuum suction mold's technological parameter is: The shell temperature 50~800, the alloy fluid degree of superheat 50~180, the vacuum suction mold's differential pressure is 2.0× 10(4) ~7.0× 10(4) Pa. This invention may the low cost half prepare the high MP and high-activity TiAl base material fineness ratio to be big continuously, the shape is complex, formation difficult part, and automobile air valve that prepares has the outstanding internal soundness, the casting property is stable.

Claims

(CN101121196)

1. 1-and-a-half kinds prepare the method of TiAl base alloy automobile air valve and close shape part continuously, its characteristic in
In using Banlian continues the vacuum induction furnace, the vacuum induction melting and method of vacuum suction mold formation, the concrete process is as follows:
(1) takes other sponge titanium, industry pure aluminum and alloying elements as the raw material, uses the CaO formation the ceramics gan
guo carries on the vacuum induction melting;

(2) casting shell air valve part's length direction and middle flow table vertical uniform distribution;

(3) the vacuum suction mold's technological parameter is: Shell temperature 50-800.deg.C, alloy fluid degree of superheat 50-180.deg.C,
Vacuum suction mold's differential pressure is 0.2-1atm.
2. Presses claim 1 to state half to prepare the TiAl base alloy automobile air valve and close shape part's side continuously France, its characteristic lies in: Stated the smelting the supply frequency in the 2000-5000Hz scope.
3. Presses claim 1 to state half to prepare the TiAl base alloy automobile air valve and close shape part's side continuously France, its characteristic lies in: When the vacuum working chamber and vacuum suction mold room's vacuum degree achieves 1.0-4.5Pa, to stove
In passes over the 0.2-2atm argon shield atmosphere, then starts to smelt the alloy.
4. Presses claim 1 to state half to prepare the TiAl base alloy automobile air valve and close shape part's side continuously France, its characteristic lies in: Vacuum induction melting and vacuum suction mold structure including high and low establishment suction mold room and smelting
The room, in suction mold room and working chamber is equipped with the gate valve, the suction mold entire process continues the smelting to gather through working chamber Banlian
The gold, suction mold room Banlian continues the loading and unloading suction mold form, and two room through an air operated gate valve connection and separate alone but
Completion.
5. Presses claim 4 to state half to prepare the TiAl base alloy automobile air valve and close shape part's side continuously France, its characteristic lies in: After smelting a suction mold stove alloy, above the suction mold room through working chamber realizes the main alloy material
Joined, above the fixed alloy loading hopper with bung joins the auxiliary alloy material, realizes Banlian to continue smelts the alloy.
6. Presses claim 1 to state half to prepare the TiAl base alloy automobile air valve and close shape part's side continuously France, its characteristic lies in uses the infrared temperature measurement and mechanical jack-in temperature measurement two temperature measurement systems.

Method smelting TiAl-base alloy by vacuum induction

CN101121967

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- **Fampat family**

CN101121967	A	2008-02-13	[CN101121967]
CN101121967	B	2010-11-24	[CN101121967B]

- **Abstract:**

(CN101121967)
The invention belongs to the vacuum metallurgy area, in particular to a method of vacuum-induction melting TiAl-based alloys. The CaO-based crucible refractory material with good thermodynamic stability and low hydration speed is as the crucible material for vacuum-induction melting; the melted alloy is the TiAl-based alloy with high chemical activity; the melting frequency is 2000 to 5000Hz. Thedetailed operation technology is: Ti, Al and other raw materials are put into the crucible at a time; the raw materials are melted in high vacuum; after all raw materials are melted, the temperature is raised to be above the melting point of 30 to 200DEG C, and cast ingots or cast parts are finally cast. The invention is applicable in melting of the TiAl -based alloys of high chemical activity; the electromagnetic stirring brings even alloy chemical components; and the content of impurity of cast ingots or cast parts can be effectively reduced by increasing melting frequency when the melting frequency is 2000 to 5000 Hz, so as to improve the quality of cast parts.

Claims

(CN101121967)

1. The methods of 1.1 vacuum induction melting TiAl base alloy, use the vacuum induction melting, its characteristic lies in
Uses the CaO crucible fire-proof material as the crucible material of vacuum induction melting;
The concrete operation technological process is:
Is 0.1Pa-4Pa passes over inert gas when the vacuum degree, causes the stove internal pressure is 0.02MPa-0.06MPa
Melts the raw material, smelts the frequency range in 2000-5000Hz;
After the raw material melts Qing completely, alloy fluid elevation of temperature to
Above after melting point 30-200.deg.C, pours obtains ingot casting or casting.
2. The method that of vacuum induction melting TiAl base alloy defers to claim 1 station, its characteristic lies in:
Uses CaO substrate crucible fire-proof material that Y[2]O[3] strengthens as crucible material of vacuum induction melting, has prepared
The regulation is as follows: (a) takes the high pure lime stonemason's workshop raw material, directly after 2700-3300.deg.C high -temperature crystallization processing, again powder
Breaks to pieces to being smaller than the 4mm pellet, after the request crystallizes, the CaO content of lime is bigger than 97.5%wt;
(b) will crystallize
The lime and granularity are smaller than the calcium fluoride mixes of 0.08mm, the quantity of calcium fluoride occupies 1-12%wt, joins to account for the gross weight
1-8%wt Y[2]O[3], joins the wetting agent dehydrated alcohol intensive mixing again, the dehydrated alcohol accounts for the gross weight 5-30%,
Then after isostatic pressing or mechanism in 1560-1680.deg.C agglutination formation.
3. The method that of vacuum induction melting TiAl base alloy defers to claim 1 station, its characteristic lies in:
Uses ZrO[2] to strengthen the CaO substrate crucible fire-proof material as the crucible material of vacuum induction melting, has prepared
The regulation is as follows: (a) takes the high pure lime stonemason's workshop raw material, directly after 2700-3300.deg.C high -temperature crystallization processing, again powder
Breaks to pieces to being smaller than the 4mm pellet, after the request crystallizes, the CaO content of lime is bigger than 97.5%wt;
(b) will crystallize
The lime and granularity are smaller than the calcium fluoride mixes of 0.08mm, the quantity of calcium fluoride occupies 1-12%wt, joins to account for the gross weight
1-8%wt Zr[2]O[3], joins the wetting agent dehydrated alcohol intensive mixing again, the dehydrated alcohol accounts for the gross weight 5-30%,
Then after isostatic pressing or mechanism in 1560-1680.deg.C agglutination formation.
4. The method that of vacuum induction melting TiAl base alloy defers to claim 1 station, its characteristic lies in:
The casting way uses the one of the kind gravity casting, the pour into centrifugal mold, the antigravity casting or suction molds.
5. The method that of vacuum induction melting TiAl base alloy defers to the claim 2 or 3 stations, its characteristic in
In: When the casting, uses one of the way gravity casting, pour into centrifugal mold, antigravity casting or suction molds.

Preparation method for gamma-TiAl alloy small fully-lamellar tissue CN103757578

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- **Fampat family**

CN103757578	A	2014-04-30	[CN103757578]

- **Abstract:**
  (CN103757578)
  The invention belongs to the field of gamma-TiAl alloy intermetallic compounds, in particular to a preparation method for a gamma-TiAl alloy small fully-lamellar tissue. The method has the technical characteristics that (a), gamma-TiAl alloy is subjected to thermal deformation in an alpha+gamma three-phase area to obtain a deformation tissue of which the alpha2-phase has a strong single deformation texture; (b), the grains in the alpha2-phase in the deformation tissue are small and uniform; (c), the deformation tissue is subjected to solid solution treatment in an alpha single-phase area for a certain time; (d), the gamma-TiAl alloy can be free of or contain trace element B; (e), the gamma-TiAl alloy tissue can be free of a beta phase. By the preparation method, the problem that the gamma-TiAl alloy part is low in plasticity at room temperature can be effectively solved, the manufacturing process difficulty and the production cost of deformation components are reduced, and the adverse influence of the conventional manufacturing process for the gamma-TiAl alloy small fully-lamellar tissue on mechanical properties is reduced.

Claims

(CN103757578)

1. One -TiAl alloy fine full-ply tissue preparation method, characterized in, this method comprises the -TiAl alloy is subjected to two -phase region + thermally deformed, the deformation structure in the final 2 phase have strong single deformation textured, and the 2 phase grains fine and homogeneous; -phase region is limited to deformation of the final solution treatment time tissue, comprising the following steps:

(1) -TiAl alloy in the + two-phase area is deformed, the deformation structure in the final 2 phase have strong single deformation textured;

(2) deforms tissues 2 fine and homogeneous phase grains, which grains having grain equiaxed morphology or whole sheet layer;

(3) -phase region in the tissue deformation solution treatment, high-temperature solid solution time does not exceed -phase texture effective to inhibit grain growth of the critical time, the resulting fine full ply tissue.

2. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, -TiAl alloy undergoes deformation of one or two or more times, the final deformed tissue 2 phase have strong single deformation textured.

3. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, -TiAl alloy, with trace elements B or B does not contain a trace element, this element to the atomic percentage of 0-0.15%.

4. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, -TiAl alloy containing a phase or the phase containing tissue, corresponding elements Al atomic percentage content of 43-48%, the atomic percentage content of Nb element 2-8%.

5. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, terms of an atomic percent basis, -TiAl alloy consists essentially of: Al43-48%; B0-0.15%; Nb2-8%; Cr1.5-3%; Ti margin.

6. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, step (1) was, -TiAl alloy in a two-phase region + , T-100-T-40°C temperature range becomes deformed, stress concentrates to 60% and above, to give 2 single phase have strong deformation textured tissue; T to -phase transition temperature, wherein Al content will vary with changes, when the Al atomic percent content of 47%, T to 1340 °C.

7. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, tissue deformation 2 phase grains having sizes in the range of 0.5-6.0 m, 2 phase deformation textured relatively random intensity in the range of 10-18.

8. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, step (3) was, the deformation structure in the -phase region of solid solution treatment, the solution time does not exceed a critical time effective to inhibit grain growth texture , wherein the temperature is T+5°C time, the solution time does not exceed 40min, obtain an average grain size in the range of 120-150 m fine uniform omni-ply tissue; T represented as phase transition temperature, which varies the magnitude Al content, atomic percent Al content of 47% at, T to 1340 °C.

9. -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, Full Sheet layer having excellent mechanical properties of tissue: room temperature yield strength of 520-600 mpa; room temperature elongation of 2.5-3.5%; room temperature fracture toughness 25-35 mpa ·m0.5;800°C long lasting strength 300-350 mpa.

Preparation method for gamma-TiAl alloy fine fully lamellar microstructure with preferred oriented lamellar interface

CN103757571

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- **Fampat family**

CN103757571	A	2014-04-30	[CN103757571]

- **Abstract:**
  (CN103757571)
  The invention relates to and belongs to the field of a gamma-TiAl-based alloy intermetallic compound and particularly relates to a preparation method for a gamma-TiAl alloy fine fully lamellar microstructure with a preferred oriented lamellar interface. According to the method, the fine fully lamellar microstructure with the preferred oriented lamellar interface is obtained on the basis of microstructure texture evolution of a gamma-TiAl alloy in the thermal deformation and the subsequent thermal treatment process. The preparation method has the technical characteristics as follows: a, a thermal deformation process is adopted to process the gamma-TiAl alloy; b, an alpha2 phase in a gamma-TiAl alloy deformed microstructure has strong deformation texture;c, the deformed microstructure is subjected to alpha single-phase region solution treatment and solution time is controlled to avoid abnormal growth of alpha crystal grains so as to obtain the fine fully lamellar microstructure. The method disclosed by the invention can effectively solve the problem of poor room temperature plasticity of the gamma-TiAl alloy fully lamellar microstructure and obtains the gamma-TiAl alloy fine fully lamellar microstructure with the preferred oriented lamellar interface and excellent comprehensive mechanical property in the bearing direction.

Claims

(CN103757571)

1. A sheet layer preferentially oriented interface where -TiAl alloy fine full-ply tissue preparation method, characterized in, this method first employ thermal deformation process shapes the -TiAl alloy, to finally obtain 2 phase has a strong deformation textured tissue; second in-phase region was deformed structure solution treatment, in order to avoid the abnormal grain growth control solution time , foam sheets and fine Full Sheet layer preferentially oriented layer interface of the tissue.

2. Manual actuation interface preferentially oriented -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, employing sheathed hot extrusion, forging or isothermal forging envelope near isothermal heat deformation process processing such as -TiAl alloy.

3. Manual actuation interface preferentially oriented -TiAl alloy fine full-ply tissue preparation method according to claim 1 or 2, characterized in, -TiAl alloy is subjected to one or two or more times the thermal deformation, and the final deformation amount is large; wherein, at an extrusion ratio of at least 6 desired compression deformation, 60% or more reduction in the required forging deforms, the deformation structure in the final 2 phase have strong deformation textured, and the 2 phase grains finely and uniformly.

4. Manual actuation of the projectional oriented interface where -TiAl alloy fine full-ply tissue preparation method according to claim 1 or 2, characterized in, heat deformation temperature of not less than 1200 °C, to obtain intact tissue deformation of the thermal cracking did not occur, in the corresponding tissue 2 phase have strong deformation textured, and the 2 phase grains finely and uniformly.

5. Manual actuation interface preferentially oriented -TiAl alloy fine full-ply tissue preparation method according to claim 1 or 2, characterized in, -TiAl alloy becomes deformed tissue, 2 phase have strong deformation textured, and the 2 phase crystal grain is fine and homogeneous grain equiaxed grains with or manual actuation.

6. Manual actuation interface preferentially oriented -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, terms of an atomic percent basis, -TiAl alloy consists essentially of: Al43-48%; Cr0-3%; Nb2-8%; B0-0.15%; Ti margin.

7. Manual actuation interface preferentially oriented -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, solution heat treatment temperature greater than T, solution time need to strictly control; wherein, T represents -phase transition temperature, Al content varies its number value, when the Al content of 47 atom %, T to 1340 °C.

8. Manual actuation interface preferentially oriented -TiAl alloy fine full-ply tissue preparation method according to claim 1 or 7, characterized in, solution heat treatment temperature is T+5°C at the time, temperature holding time of 5-40min; wherein, T represents -phase transition temperature, Al content varies its number value, when the Al content of 47 atom %, T to 1340 °C.

9. Manual actuation of the projectional oriented interface where -TiAl alloy fine full-ply tissue preparation method according to claim 1, characterized in, tissue deformation 2 phase grains having sizes in the range of 0.5-40 m, 2 phase deformation textured relatively random intensity in the range of 5-15; the final full slice tissue average crystal grain size in the range of 120-150 m; room temperature mechanical properties of the corresponding full-ply tissue: yield strength of 400-600 mpa; elongation of 2.0-3.5%; fracture toughness 20-30 mpa ·m0.5.

Method for preparing TiAl alloy bar material
CN101457331

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- **Abstract:**
  (CN101457331)
  The invention relates to an intermetallic compound preparation forming technique, in particular to a preparation method of TiAl alloy bar. The preparation method comprises the process flow as follows: billet, homogenization heat treatment, turning, sheathing, extruding, removing sheath and subsequent heat treatment; the extrusion intermittent time is precisely controlled so that the sheathing material and TiAl alloy are consistent during extrusion deformation, thus successfully gaining bars with excellent comprehensive performance. By composite sheathing of brittle material intermetallic compound TiAl alloy, the preparation method leads the TiAl alloy to deform by the traditional extrusion method, thus reducing the dependence on the equipment to a great extent; by strictly controlling the extrusion intermittent time and adjusting the air cooling time after the TiAl alloy is taken out of a furnace and the staying time in the extrusion cylinder, the preparation method leads the sheathing material and the TiAl alloy to generate temperature gradient so as to achieve the rheological resistance to match deformation harmonization; the prepared bar has sufficient deformation and smooth surface without cracks; the gained TiAl alloy has fine and uniform microstructure and excellent comprehensive mechanic performance.

Claims

(CN101457331)

1. The technological process of a TiAl alloy round bar preparation method are: Preform body -->Univoltine heat treatment -->Turning is processed -->Wrap up set -->Squeezing -->Wrap up set -->Subsequent heat treatment, characterized by,
Crush: Crush the temperature range 1250-1400 .deg.C, preserve heat for 40-60 minutes, make, the extrusion billet produces furnace rear, stagnate one interval 15-30s in air and container.
2. TiAl alloy round bar preparation method according to claim 1, characterized by, TiAl alloy compounded and wrapped up set, wraps up set it with adopting heat insulating material to isolate between TiAl preform body, it is stainless steel, titanium or titanium alloy to wrap up one set of materials.
3. TiAl alloy round bar preparation method according to claim 1, characterized by, TiAl alloy preform body, in order that turning is shaped after the casting or powder sinter.
4. TiAl alloy round bar preparation method according to claim 3, characterized by, wherein cast and adopt once to dawdle and add reaction and suspend the investment by oneself.
5. TiAl alloy round bar preparation method according to claim 1, characterized by, the univoltine heat treatment: Preserve heat for 4-10 hours at 1250-1400 .deg.C, furnace cooling, carry on a chill profing of ingredient.
6. TiAl alloy round bar preparation method according to claim 1, characterized by, crush, remove wrapping up set and carry on the subsequent heat treatment of regular TiAl alloy through the machinery or chemical means.
7. TiAl alloy round bar preparation method according to claim 1, characterized by, the shape changes speed range into 0.1-5s (-1).