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CN102268568	TiAl-based alloy with excellent high temperature oxidation resistance and creep resistance suitable for casting LUOYANG SUNRUI TITANIUM PREC CASTING
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CN101942583	High-temperature resistant TiAl-based alloy with excellent casting performance and preparation method thereof LUOYANG SUNRUI TITANIUM PREC CASTING

Low cost TiAl-based alloy with excellent high temperature performance and castability

CN102312127

<ul style="list-style-type: none"> • Patent Assignee LUOYANG SUNRUI TITANIUM PREC CASTING • Inventor CHEN ZHIQIANG ZHOU HONGQIANG • International Patent Classification C22C-014/00 	<ul style="list-style-type: none"> • Publication Information CN102312127 A 2012-01-11 [CN102312127]  • Priority Details 2011CN-0254621 2011-08-31 								
<ul style="list-style-type: none"> • Fampat family <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">CN102312127</td> <td style="width: 10%;">A</td> <td style="width: 20%;">2012-01-11</td> <td style="width: 30%;">[CN102312127]</td> </tr> <tr> <td>CN102312127</td> <td>B</td> <td>2013-06-05</td> <td>[CN102312127B]</td> </tr> </table> 		CN102312127	A	2012-01-11	[CN102312127]	CN102312127	B	2013-06-05	[CN102312127B]
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CN102312127	B	2013-06-05	[CN102312127B]						

- **Abstract:**

(CN102312127)

The invention relates to a low cost TiAl-based alloy with excellent high temperature performance and castability. A concrete chemical component of the alloy comprises the following atoms: Ti, 44.0-48.0% of Al, 0.5-2.0% of Cr, 0.5-2.0% of V, 0.1-0.7% of C, and the balance of avoidless impurity elements. Compared with Ti-46.5Al-1Cr-2.5V alloy materials, the material of the alloy of the invention has a more excellent high temperature creep resistance, a more excellent oxidation resistance, a lower cost, and a same casting flow property, so the alloy is suitable for casting automobile components of Ti-Al turbines and the like which can be used for a long time at 850-900DEG C, thereby the alloy of the present invention has a huge market prospect.





Claims

(CN102312127)

1. A high temperature properties and low-cost titanium aluminum alloy casting can be excellent, characterized in that: the specific chemical composition of the alloy having a composition by atomic percent: Ti-(44.0-48.0)Al-(0.5-2.0)Cr-(0.5-2.0)V-(0.1-0.7)C, the balance being inevitable impurity elements.
2. According to claim 1 which exhibits excellent high temperature properties and a low-cost titanium aluminum alloy casting, characterized in that: the atomic percentage composition of chemical composition of the alloy: Al to 45.0-47.0 at %; Cr was 0.5-1.5 at %; V to 1.0-2.0 at %; C as a 0.2-0.6 at %.
3. According to claim 1 which exhibits excellent high temperature properties and a low-cost titanium aluminum alloy casting, characterized in that: the atomic percentage composition of the alloy chemistries: Al 46 at %; Cr1.0 at %; V 1.5 at %; C 0.3 at %.

TiAl-based alloy with excellent high temperature oxidation resistance and creep resistance suitable for casting

CN102268568

<ul style="list-style-type: none"> • Patent Assignee LUOYANG SUNRUI TITANIUM PREC CASTING • Inventor ZHOU HONGQIANG CHEN ZHIQIANG BAO SHUJUAN WANG MENGQUANG WU SHENGNAN LIU GUOLIANG • International Patent Classification C22C-014/00 	<ul style="list-style-type: none"> • Publication Information CN102268568 A 2011-12-07 [CN102268568]     • Priority Details 2011CN-0219462 2011-08-02 								
<ul style="list-style-type: none"> • Fampat family <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">CN102268568</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 20%;">2011-12-07</td> <td style="width: 30%;">[CN102268568]</td> </tr> <tr> <td>CN102268568</td> <td style="text-align: center;">B</td> <td>2013-01-02</td> <td>[CN102268568B]</td> </tr> </table> 		CN102268568	A	2011-12-07	[CN102268568]	CN102268568	B	2013-01-02	[CN102268568B]
CN102268568	A	2011-12-07	[CN102268568]						
CN102268568	B	2013-01-02	[CN102268568B]						

- **Abstract:**

(CN102268568)


The invention discloses a TiAl-based alloy with excellent high temperature oxidation resistance and creep resistance suitable for casting and the alloy belongs to the gamma-TiAl alloy. The TiAl-based alloy comprises the following components by atomic percent: 44.0-48.0% of Al, 1.0-3.0% of Nb, 0.1-3.0% of Mo, 0-0.8% of Si or/and 0-0.6% of C, and the balance of Ti and impurity elements, wherein the sum of the atomic percents of Si and C is 0.1-0.9%. The TiAl-based alloy disclosed by the invention has good high temperature performances and casting fluidity and is suitable for the casting of thin-walled parts; methods such as chemical treatment, thermal spraying and ion implantation which are used to increase the oxidation resistance, are not required to treat the surface of the alloy at 850-950 DEG C; and the TiAl-based alloy is particularly suitable to cast the gasoline engine supercharger turbine rotor which can work below 900-950 DEG C.

Claims

(CN102268568)

1. A high temperature antioxidant creep titanium aluminum alloy for casting excellent creep property, characterized in that: belonging to -TiAl alloys, and atomic percentage composition of specific chemical composition: Al: 44.0-48.0 at %, Nb: 1.0-3.0 at %, Mo: 1.0-3.0 at %, Si and the C elements wherein one or two, wherein Si: 0-0.8 at %, C: 0-0.6 at %, and the total amount of Si and the element C 0.1-0.9 at %, the remainder being Ti and unavoidable impurity element.
2. Titanium aluminum alloy according to claim 1, characterized in that: the atomic percentage of the alloy having a composition: Ti-(44.0-48.0)Al-(1.0-3.0)Nb-(0.1-3.0)Mo-(0.1-0.8)Si.
3. Titanium aluminum alloy according to claim 1, characterized in that: the atomic percentage composition of the alloy: Ti-(44.0-48.0)Al-(1.0-3.0)Nb-(0.1-3.0)Mo-(0.1-0.6)C.
4. Titanium aluminum alloy according to claim 1, characterized in that: the atomic percentage of alloy having a composition: Ti-(44.0-48.0)Al-(1.0-3.0)Nb-(0.1-3.0)Mo-(0.1-0.8)Si -(0.1-0.6)C, and the total amount of C and the Si 0.2-0.9 at %.
5. According to claim 2, 3 or 4 titanium aluminum alloy according to any one, characterized in that: the atomic percentage composition of alloys: Al was 46.0-48.0 at %; Nb was 2.0-3.0 at %; Mo was 1.0-2.0 at %.
6. Titanium aluminum alloy according to claim 2, characterized in that: the atomic percentage of alloy having a composition: Si at 0.2-0.6 at %.
7. Titanium aluminum alloy according to claim 3, wherein: alloy having a composition in atomic percent of: C as a 0.2-0.5 at %.
8. Titanium aluminum alloy according to claim 4, characterized in that: the atomic percentage of alloy having a composition: Si at 0.2-0.6 at %, C at 0.2-0.5 at %.
9. Titanium aluminum alloy according to claim 8, characterized in that: the atomic percentage composition of the alloy: Si is a 0.4 at %, C to 0.3 at %.

TiAl-based alloy material with excellent high-temperature property and preparation method thereof
CN101948967

<ul style="list-style-type: none">• Patent Assignee LUOYANG SUNRUI TITANIUM PREC CASTING• Inventor HONGQIANG ZHOU JIANWEI JIANG• International Patent Classification C22C-001/02 C22C-014/00	<ul style="list-style-type: none">• Publication Information CN101948967 A 2011-01-19 [CN101948967] • Priority Details 2010CN-0297735 2010-09-30				
<ul style="list-style-type: none">• Fampat family <table><tr><td>CN101948967</td><td>A</td><td>2011-01-19</td><td>[CN101948967]</td></tr></table>		CN101948967	A	2011-01-19	[CN101948967]
CN101948967	A	2011-01-19	[CN101948967]		

- **Abstract:**

(CN101948967)

The invention introduces a TiAl-based alloy material with excellent high-temperature property. The TiAl-based alloy belongs to gamma-TiAl alloy and comprises the following chemical compositions in percentage by weight: 44.0 to 48.0 percent of Al, 3.0 to 5.0 percent of Nb, 0.1 to 3.0 percent of Mo, 0 to 0.8 percent of Ni, 0 to 0.8 percent of Si and the balance of Ti and inevitable impurities. A preparation method comprises a step of smelting and casting the materials in a vacuum consumable-electrode arc kish furnace or vacuum induction furnace, wherein a TiAl alloy ingot is subjected to vacuum melting or argon-filling melting first and then is cast in the casting process. Compared with the common TiAl alloy, the TiAl-based alloy material with excellent high-temperature property has higher usage temperature of up to 900 DEG C and has the advantages of good plasticity at room temperature, good creep-deformation resistance and oxidation resistance, good casting property, suitability for casting thin-wall components and great market prospect.

Claims

(CN101948967)

1 . Titanium aluminum alloy material excellent in the resistance of a high temperature, characterized in that: the alloy belonging to -TiAl alloy, the mass percentage composition of chemical composition: Al: 44.0-48.0at %, Nb: 3.0-5.0at %, Mo: 3.0-3.0at %, Ni: 0-0.8at %, Si: 0-0.8at %, the remainder being Ti and unavoidable impurity element .

2 . Titanium aluminum alloy material excellent in high-temperature properties according to claim 1, characterized in that: the chemical composition of the alloy compositions are percent by mass: Al: 46.0-47.0at %; Nb: 3.0-4.5at %; Mo: 3.0-2.0at %; Ni: 3.0-0.6at %; Si: 3.0-0.6at % .

3 . Titanium aluminum alloy material excellent in high-temperature properties according to claim 2, characterized in that: the chemical composition of the alloy compositions are percent by mass: Al: 46.5at %; Nb: 4 . 0at %; Mo: 3.0 at %; Ni: 0 . 3at %; Si: 0 . 4at % .

4 . Titanium aluminum alloy material excellent in high-temperature performance claim 1 A method of preparing, using titanium sponge or other titanium material, AlNb alloy, AlMo alloy, pure Ni, pure Al and pure Si as a raw material, the composition of the alloy can be made according to the scaling or other desired material, a consumable electrode arc skull furnace or vacuum in a vacuum induction furnace and cast molding were melted, cast molding may be titanium aluminum alloy ingot after casting or after refining is carried out subject to vacuum melting pouring argon; vacuum melting the ingot after casting refers to a certain vacuum is required prior to the load lock vacuum melting, and is subject to titanium aluminum alloy cast backward movable completely melted liquid; Argon Argon after refining casting process refers to a degree of vacuum within the load lock forebearth necessitating smelting, after smelting is carried out after a certain pressure to the purging with Argon, and is subject to titanium aluminum alloy cast backward movable completely melted liquid .


5 . Preparation method according to claim 4, wherein: induction furnace smelting titanium-aluminum alloy ingot having two or more times is required to ensure the uniformity of the material; titanium aluminum alloy ingot is prepared by: first titanium extrusion aluminum alloy electrode, after smelting titanium aluminum alloy ingot and electricity since the vacuum in the electric arc furnace .

6 . Preparation method according to claim 4, characterized in that: a flush is required within a certain degree of vacuum load lock forebearth smelting, vacuum in the 3.5Pa or less .

7 . Preparation method according to claim 4, wherein: argon was charged to a certain pressure, argon gas pressure is 60000Pa or more.

High-temperature resistant TiAl-based alloy with excellent casting performance and preparation method thereof

CN101942583

<ul style="list-style-type: none"> • <u>Patent Assignee</u> LUOYANG SUNRUI TITANIUM PREC CASTING • <u>Inventor</u> HONGQIANG ZHOU JIANWEI JIANG MENGGUANG WANG • <u>International Patent Classification</u> C22C-001/02 C22C-014/00 	<ul style="list-style-type: none"> • <u>Publication Information</u> CN101942583 A 2011-01-12 [CN101942583]  • <u>Priority Details</u> 2010CN-0297774 2010-09-30
<ul style="list-style-type: none"> • <u>Fampat family</u> CN101942583 A 2011-01-12 [CN101942583] 	

- **Abstract:**

(CN101942583)

The invention provides a high-temperature resistant TiAl-based alloy with excellent casting performance, which belongs to the gamma-TiAl alloy. The alloy comprises the following chemical components in percentage by mass: 44.0 to 48.0 percent of Al, 3.0 to 5.0 percent of Nb, 0.2 to 2.0 percent of V, 0 to 0.8 percent of Ni, 0 to 0.8 percent of Si, and the balance of Ti and inevitable impurity elements. The preparation method comprises the following step of melting the raw materials in a vacuum consumable electrode arc skull furnace or a vacuum induction furnace and performing cast molding, wherein before the step of casting, vacuum melting can be performed on the TiAl alloy cast ingot or argon-filling melting can be performed on the TiAl alloy cast ingot. The high-temperature resistant TiAl-based alloy has higher use temperature compared with the conventional TiAl alloy, has excellent room temperature plasticity and excellent creep resistance and oxidation resistance, has excellent casting performance, is suitable for casting of thin-walled parts, and has huge market prospect.

Claims

(CN101942583)

- 1 . Titanium aluminum alloy sheet which is excellent in casting one of a high temperature, characterized in that: the alloy belonging to -TiAl alloy, Al: 44.0 mass percentage composition of the specific chemical component-48.0at %, Nb: 3.0-5.0at %, V: 3.0-2.0at %, Ni: 0-0.8at %, Si: 0-0.8at %, the remainder being Ti and unavoidable impurity element .
- 2 . Titanium aluminum alloy casting according to claim 1 an excellent performance of high-temperature-resistant, characterized in: specific chemical composition mass percentage composition of alloys: Al: 46.0-47.0at %, Nb: 3.0-4.5at %, V: 3.0-1.0at %, Ni: 3.0-0.6at %, Si: 3.0-0.6at %, the remainder being Ti and unavoidable impurity element .
- 3 . Titanium aluminum alloy casting with excellent properties of high temperature resistant according to claim 2, characterized in that: the specific chemical component mass percentage composition of alloys: Al: 46.5at %; Nb: 4 . 0at % ;: 3.0 at %; Ni: 0 . 3at %; Si: 0 . 4at % .
- 4 . Claim 1 of the high-temperature-resistant titanium aluminum casting one method for producing alloy exhibits excellent properties, characterized in that: alloy with titanium sponge or other titanium material, AlNb alloy, AlV alloy, pure Ni, pure Al and pure Si as a raw material, the composition of the alloy can be made according to the scaling or other desired material, a consumable electrode arc skull furnace or vacuum in a vacuum induction furnace and cast molding were melted, cast molding may be titanium aluminum alloy ingot after casting or be subject to vacuum melting pouring the melted argon; vacuum melting the ingot after casting refers to a certain vacuum load lock is required prior to vacuum melting, and is subject to titanium aluminum alloy cast backward movable completely melted liquid; Argon Argon after refining casting process refers to a degree of vacuum within the load lock forebearth necessitating smelting, after smelting is carried out after a certain pressure to the purging with Argon, and is subject to titanium aluminum alloy cast backward movable completely melted liquid .
- 5 . Preparation method according to claim 4, wherein: induction furnace smelting titanium-aluminum alloy ingot is required to ensure homogeneity of the material melting two or more times .
- 6 . Preparation method according to claim 4, characterized in that: a titanium aluminum alloy ingot having a consumable electrode arc skull furnace vacuum cast film is prepared by: first titanium extrusion aluminum alloy electrode, since the vacuum after the titanium aluminum alloy ingot was melted in an electric arc furnace and electricity .
- 7 . Preparation method according to claim 4, characterized in that: a flush within pre-evacuation cycle in the smelting forebearth 3.5Pa or less is required .
- 8 . Preparation method according to claim 4, wherein: argon was charged to a certain pressure after the time of melting is performed at an argon pressure 60000Pa or more.