Property Study on High-Speed Steel Deposited TiN Coatings by Magnetron Sputter Ion Plating
Authors: Ning Zhang, Chun Hong Zhang, Ying Huai Qiang
Abstract: TiN coatings were deposited by Magnetron Sputter Ion Plating (MSIP) on the surface of high-speed steel W18Cr4V. The microstructure, coating thickness, micro-hardness and wear resistance of surface modification sample were investigated by the D/MAX-Ⅲ B X-ray diffraction tester, the coating thickness tester, the HV-1000 micro-sclerometer, the LKDM2000 friction and wear tester, the S-3000N scanning electron microscopy. The influence of sputtering time, N2 partial pressures and sputtering current on the microstructure, coating thickness, micro-hardness and wear resistance of TiN coatings were also analysed. The best synthesis performance sputtering coatings of technologic scheme was established.

Experimental Study on the Forming Limit Diagram of QP980 under Variable Pressing Velocities
Authors: Lei Ding, Jian Ping Lin, Zheng Pang
Abstract: QP steel has great application potential for automotive industry for its ultrahigh strength and good plasticity. In this paper, the forming limit diagram (FLD) of QP steel was experimentally studied using spherical punch test. The forming limit curves (FLC) of QP steel in room temperature under two pressing velocities (20mm/s, 2mm/s) were obtained. It has been found that the deformation velocity affects the FLC obviously; the FLC declines with the increase of pressing velocity. Compared with other AHSS under the same strength grade, QP steel keeps high strength without a significant loss of plasticity.

Study of Metallurgical Properties in the Sintered Ore with Variable SiO₂
Authors: Qing Jun Zhang, Yuan Liang Li, Xue Gang Ma, Zhi Min Cui, Yu Zhu Zhang
Abstract: The low silicon sintered ores are prepared, where SiO₂ content is 4.4%, 4.6%, 4.8%, 5.0% and 5.2%, respectively. Their metallurgical properties are also measured. The results state that the low temperature reduction degradation of low silicon sinter is improved with the SiO₂ content increase. With the SiO₂ content increasing in low silicon sinter, the reducing index sharply decline, and reduction gradually deteriorate. In the meantime, softening initial temperature gradually reduced, softening interval gradually widened, so exceeded SiO₂ content does harm to softening property.

Investigation on Behavior of the early Stage of Aging in C17200 Alloys
Authors: Hua Feng Lou, Qiang Song Wang, Guo Liang Xie, Li Jun Peng
Abstract: An investigation on behavior of the early stage of aging and its influence on the performance of C17200 alloys is conducted in this paper. It is indicated that spinodal...
Effect of Tungsten Addition on Microstructure and Mechanical Properties of TiAl-Based Alloy
Authors: Hong Liang Sun, Ze Wen Huang, De Gui Zhu
Abstract: The effect of different tungsten addition on microstructure and mechanical property of TiAl-based alloy was investigated. The results indicate that the size and amount of β (B2) phase and equiaxed γ phase gradually increase with increasing content of tungsten. The grain size and lamellar spacing obey a parabolic law. The tungsten addition can increase the room temperature creep rupture life has inverse correlation relationship with the content of tungsten.
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Analysis on Affecting Factors of Slab Surface Transversal Corner Crack for Medium-Carbon Steel with Boron in Continuous Casting
Authors: Qi Chun Peng, Zhi Bo Tong, Dan Ping Fan
Abstract: Based on the production practice of boron microalloyed medium-carbon steel, oscillating curve, cooling water flow in mould, secondary cooling system and arc alignment can provide experimental support for the Mg-Gd-Y three element alloy phase diagram.
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Calculation of the Mg-Gd-Y Alloy Equilibrium Phase Diagram and its Verification at 450°C
Authors: Yong Chun Guo, Ying Ming Sang, Jian Ping Li, Zhong Yang
Abstract: The Mg-Gd alloy, Mg-Y alloy equilibrium phase diagram has been characterized using the multiple phase equilibrium calculation software (Pandat) and the magnesium alloy diffusion couple. The Mg-Gd alloy is more likely to form a two-phase region of Mg-Gd and Mg-Gd-Y, and the Mg-Y alloy is more likely to form a two-phase region of Mg-Y and Mg-Gd-Y. The diffusion layer and its phase region are consistent with the data from the phase equilibrium calculation. This research can provide experimental support for the Mg-Gd-Y three element alloy phase diagram.
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Study on the Critical Damage Value and Processing Map of AZ80 Magnesium Alloy Forming at Elevated Temperatures
Authors: Yong Xue, Zhi Min Zhang, Yao Jin Wu
Abstract: In the present research, a series of AZ80 magnesium alloy billets were compressed with 60% height reduction on hot process simulator at temperatures of 188-573 K to investigate the critical damage value at different temperatures. According to the Cockcroft-Latham equation, the critical damage value is calculated from the finite element calculations for the compression tests. The results show that the critical damage value is a constant but varies in a range from 0.1397 to 0.4653. Meanwhile, the processing maps based on the Cockcroft-Latham equation show that the deformation and fracture behavior of AZ80 magnesium alloy billets are significantly affected by the processing parameters, such as temperature and strain rate. The critical damage value and processing map can be used to optimize the forming process and improve the performance of AZ80 magnesium alloy billets.
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The Improved Friction Properties of Bonded MoS2 Films by MAO Treating of Al Substrate
Authors: Han Jun Hu, Hui Zhou, Yu Gang Zheng, Kai Feng Zhang, Zhi Hua Wan
Abstract: The bonded MoS2 films are widely used as solid lubricants in aerospace mechanisms due to their excellent tribological properties. Traditionally, the MoS2 was directly bonded on the substrate. However, this method has some drawbacks, such as poor bonding strength and difficulty in controlling the film thickness. Recently, ma microarc oxidation (MAO) instead of sandblast was introduced as a new technique for treating of Al substrate. In this article, the tribological properties of MoS2 films, micro arc oxidation (MAO) instead of sandblast was used to improve the bonding strength and control the film thickness. The tribological properties of the bonded MoS2 films were investigated using a pin-on-disc tribometer. The results show that the bonding strength and film thickness of the bonded MoS2 films were significantly improved by using MAO instead of sandblast.
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Mechanical Properties of WC-Co Cemented Carbide Prepared via Vacuum Sintering
Authors: Bing Liang Liang, Yun Long Ai, Chang Hong Liu, Nan Jiang
Abstract: WC-Co cemented carbide specimens were prepared via vacuum sintering. The influences of composition and sintering temperature on phase composition, microstructure and mechanical properties of WC-Co cemented carbide were investigated. The results show that the hardness of the coating is higher than the Al, and the transverse rupture strength (TRS) ascended to peak value and then descended. WC-Co cemented carbide with excellent mechanical properties (HRA>90, Trs~700MPa and KIC>10MPa•m1/2) were obtained.
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