

1972年创刊

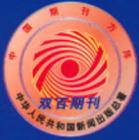
全国优秀科技期刊 全国中文核心期刊

Rejiagong Gongyi

ISSN1001-3814

CN61-1133/TG

CODEN: REHOEL



# 热加工工艺

## HOT WORKING TECHNOLOGY

# 17

### 2012

### 第41卷

### (总第351期)

<http://www.rjggy.net>

邮发代号: 52-94

### 金属铸锻焊技术

铸造品牌, 锻造品质

## 2012, 我们一直在努力



500kW标准设备



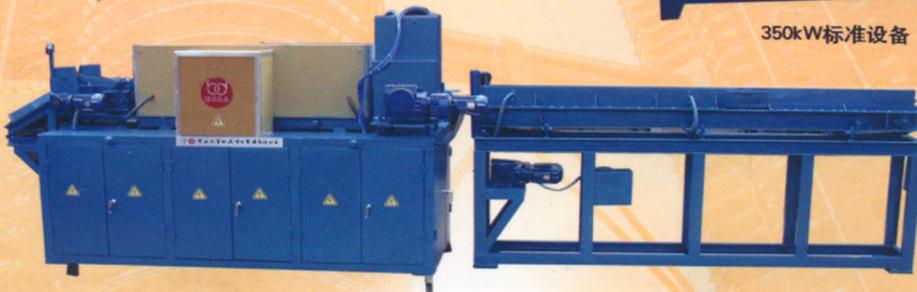
大型圆环加热



钢瓶加热



350kW标准设备



500kW小生产线



中外合资西安博大电炉有限公司  
XI'AN BODA ELECTRIC FURNACE CO., LTD

地址: 陕西省西安市枣园西路中段 邮编: 710077

E-mail: [market@cboda.com](mailto:market@cboda.com)

电话: 0086-029-84611176 84629261

传真: 0086-029-84625274

<http://www.cboda.com/>



17>

中国船舶重工集团公司第十二研究所 合办  
中国造船工程学会船舶材料学术委员会

## 实验与研究 Experiment & Research

- 快速凝固及 Si 元素对 Mg-Al 合金组织与腐蚀性能的影响 ..... 赵 聘,梁 伟,樊 强,等 1  
Effect of Rapid Solidification and Si Element on Microstructure and Corrosion Property of Mg-Al Magnesium Alloy
- 稀土 La 对铝镁合金凝固曲线和微观组织的影响 ..... 易荣喜,谢世坤,郑小秋,等 6  
Effect of Rare Earth Larium on Solidification Curve and Microstructure of Al-Mg Alloy
- 等通道挤压对 Mg-12Al-0.7Si-0.09Sr 镁合金组织与性能的影响 ..... 樊家林,梁 伟,王红霞,等 8  
Influence of Equal Channel Angular Pressing on Microstructure and Mechanical Properties of Mg-12Al- 0.7Si-0.09Sr Magnesium Alloy
- 热压缩流变应力曲线的修正方法 ..... 彭宁琦,唐广波,刘正东 12  
Correcting Method of Flow Stress Curve for Hot Compression
- 低品位红土镍矿直接还原焙烧-磁选试验研究 ..... 杨双平,贺 峰,杜 刚 16  
Research on Direct Reduction Roasting and Magnetic Separation of Low-grade Laterite Nickel Ore
- 热模拟法研究 07MnNiCrMoVDR 钢再热裂纹敏感性 ..... 刘俊松,陈学东,卜华全 19  
Study on Reheating Crack Susceptibility of 07MnNiCrMoVDR Steel by Thermo-mechanical Simulator
- 铸件尺寸对镍基单晶高温合金力学性能的影响 ..... 史振学,韩 梅,刘世忠,等 22  
Influence of Casting Size on Mechanical Properties of Ni-base Single Crystal Superalloy
- 终轧温度对含 P 高强 IF 钢组织和性能的影响 ..... 耿伟,吝章国,江海涛,等 25  
Effect of Final Rolling Temperature on Microstructure and Properties of IF Steel with P
- 挤压温度对往复挤压工业纯镁组织性能的影响 ..... 陈思杰 28  
Influence of Extrusion Temperature on Microstructure and Properties of Reciprocating Extruding Pure Magnesium
- 离心铸造 Cu-17Ni-3Al-X 合金铸件的组织特征和宏观偏析 ..... 罗宗强,辛保亮,周 毅,等 31  
Macrostructure Characteristics and Macroscopic Segregation of Cu-17Ni-3Al-X Alloy Castings by Centrifugal Casting

## 铸造技术 Casting Technology

- 锌铝合金凝固缺陷数值分析 ..... 张 莹,周志磊,徐金华,等 35  
Numerical Analysis on Solidification Defects of Zinc-Aluminum Alloy
- 影响连铸连轧电工铝杆性能的分析 ..... 高 鹏 37  
Analysis of Affecting Properties of Electrical Aluminum Rod Produced by Continuous Casting and Rolling
- 型砂配方对型砂性能影响的试验研究 ..... 夏 翔,谢世坤,肖忠跃,等 40  
Experimental Study of Effect of Casting Sand Formula on Its Performance
- 低合金耐磨铸钢煤矿掘进机履带板的研制 ..... 李 平,李锋军,刘松涛,等 42  
Development of Low Alloy Wear-resistant Steel Caterpillar Board in Coal Mining Roadheader
- 石墨坩埚性能的影响因素分析 ..... 孟 梅,张 颖,张军战,等 45  
Analysis on Performance Affecting Factors of Graphite Crucible
- 脉冲磁致振荡对纯铝熔体电磁力和流场影响的数值模拟 ..... 刘 芳,张璐云 48  
Numerical Simulation of Effect of Pulse Magneto-oscillation on Magnetic Force and Flow Field of Pure Aluminum Melt
- 刮板输送机右轨座的铸造工艺设计及模拟优化 ..... 米国发,郑喜平,王 英 52  
Casting Process Design and Simulation Optimization of Right Rail Block
- 铝铸轧用铸嘴的优化设计 ..... 郭彦宏,王金辉,韩 丽,等 55  
Optimal Design of Cast Mouth for Aluminum Roll-casting
- 倾倒式浇注过程驱动力及流量变化特性分析 ..... 严宏志,金 凯,谭武中 60  
Analysis of Driving Force and Flow Changing Characteristic in Dumping Casting Process
- 4032B 铝合金活塞熔炼铸造工艺研究 ..... 陈 艳,唐前鹏,王孟君 64  
Research of Melting and Casting Technology for 4032B Aluminium Alloy Pistons

大断面球墨铸件石墨漂浮现象的分析与处理	魏家鹏,潘宏歌	67
Analysis and Processing on Graphite Floatation of Heavy Section Ductile Iron Parts		
基于 ViewCast 的齿轮轴铸钢件的工艺优化	南红艳,胡玉昆,米国发,等	69
Technology Improvement and Optimization of Steel Gear Shaft Castings Based on ViewCast		
连铸工艺生产 SA-213T23 超(超)临界锅炉管坯钢存在的问题及对策	高兵,张妍,李英奎,等	72
Problems and Countermeasures Existed in Producing Tube Blank Steel SA-213T23 by Continuous Casting Process for Supercritical (Ultra-supercritical) Boiler		
火力发电厂铸造阀门常见缺陷及处理方案	王强,王志永,孔维刚,等	74
Solution Methods for Common defects of Casting Valve Used in Thermal Power Plant		
基于 CAD/CAE 的铝合金框架低压铸造工艺设计	张光明,王泽忠,吴代建	76
Technology Design of Low Pressure Die Casting for Aluminum Frame Based on CAD/CAE		
核电站主管道离心铸造直管的质量控制研究	施熔刚,闾玉琦,张丽丹,等	78
Quality Control of Nuclear Power Plant Reactor Coolant Pipe Prepared by Centrifugal Casting		

## 锻压技术 Forging Technology

基于挡楔的楔横轧工艺应力应变分析	魏新红,束学道,彭文飞	81
Analysis of Stress and Strain Based on Cross Wedge Rolling Process of Block Wedge		
基于汽车轮罩软模开发的 CAE 模拟优化	刘林枝	84
CAE Simulation and Optimization Based on Soft Die Development of Wheelhouse		
基于有限元的椭圆件变压边力冲压成形工艺研究	张跃,张乐莹,陆广华,等	88
Research of Drawing Process on Variable Blank Holder Force for Elliptic Pieces Based on Finite Element Analysis		
热轧平三角-圆三角孔型的数学模型及有限元分析	王建军,潘露,帅美荣	91
Mathematical Model and Finite Element Analysis of Hot-rolling Flat Triangle-round Triangle Sequence Pass		
冲床上触指挤压成形技术	刘晓焱,王晓飞	95
Extrusion Process of Button Contact in Stamping Machine		
基于 Dynaform 的真实拉延筋端部形状的模拟研究	彭成允,关婧,李小平,等	97
Simulation on End Shape of True Draw Bead Based on Dynaform		
轧制温度及二次除鳞对船板表面质量的影响	李鑫磊,董占斌,张跃飞,等	100
Influence of Rolling Temperature and Secondary Descaling on Surface Quality of Ship Plate		
基于拉延筋和压边力的差厚拼焊板拉延成形回弹预测与控制	夏江梅,张黎,文珊,等	103
Prediction and Control of Drawing Springback of Tailor-Welded-Blank Based on Draw Bead and Blank Holder Force		
汽车支撑板拉延成形的数值分析	欧阳波仪	106
Numerical Analysis of Drawing for Car Support Plate		
大型突变截面连杆制坯辊锻工艺与数值模拟	田平,彭成允,罗静	109
Roll Forging Process and Numerical Simulation of Connecting Rod Blank with Large and Different Sections		
基于金属热成形过程的晶粒粗化现象数值模拟	范昌胜,郭强,李斌	113
Numerical Simulation of Grain Coarsening Based on Hot Forming Process for Metallic Materials		
AZ80 镁合金底座预成形的数值模拟研究	崔亚,崔财威,李旭斌,等	117
Numerical Simulation on Preforming of AZ80 Magnesium Alloy Base		
Y12 易切削钢锭盘温挤压工艺	于静,辛选荣,贺成松,等	119
Warm Extrusion Process for Y12 Cutting Steel Wharves		
TC11 钛合金叶片终锻过程三维有限元模拟	齐广霞,王中原,徐培培	122
3D FEM Simulation of TC11 Alloy Blade Precision Forging Process		
一种轴锻件的锻锻成形工艺设计	李高峰,翟江波,张晗,等	126
Upsetting Process Design of A Shaft Forging		

读者若发现本刊有印刷、装订质量问题,请寄回编辑部调换。

### 焊接技术 Welding Technology

一种低熔点铝合金硬钎料的研究	朱翔,杨成刚,常迅伟	128
Development of Low Melting Point Filler Metal for Brazing Al Alloys		
电阻点焊压痕深度的 SVM 回归预测	张鹏贤,冯毅,刘兴刚	130
Predication of Regression Indentation Depth in RSW Based on SVM		
高碳钢盘条电阻对焊质量的影响因素分析	杨辉	134
Analysis on Influence of Rod Resistance on Upset Butt Welding Quality of High Carbon Steel		
PDC 钻头焊接强度的有限元分析	张晓亮,孙荣军,姜政刚	136
Analysis on Welding Strength of PDC Bit by Finite Element		
Q345D 钢水箱支架 T 型接头双道 MAG 焊接热过程的有限元分析及实验验证	刘先明,宫长治,陈凌飞,等	139
Numerical Simulation and Experiment Study on Thermal Process of Q345D Steel Tank Bracket T-joint Double-side MAG Welding		
活性剂对钛合金钨极氩弧焊的影响	周泽杰,黄志超,罗贤良	142
Effect of Activating Flux on A-TIG Welding of Ti Alloy		
基于 SYSWELD 的 TIG 堆焊试件应力及变形数值模拟分析	李少海	145
Numerical Simulation on Stress and Deformation of TIG Surfacing Specimen Based on SYS WELD		
奥氏体不锈钢复合钢板焊接工艺及接头组织研究	廖慧敏,宋凯强,曹艳平,等	148
Welding Process and Welded Joint Microstructure of Austenitic Stainless Clad Steel Plate		
铝/镁异种金属搭接搅拌摩擦焊接温度场数值模拟研究	万昕,陈影,沈长斌,等	151
Numerical Simulation on Temperature Fields of Al-Mg Dissimilar Metal Lap Friction Stir Welding		
镁-钢异种金属无匙孔搅拌摩擦点焊工艺的研究	王希靖,赵钢,王培中,等	153
Process Research on Friction Stir Spot Welding Without Key Hole Between Magnesium and Steel Dissimilar Alloys		
空气湿度和钢板初始温度对高强钢熔敷金属扩散氢含量的影响	李兴霞,崔国明,吴金杰	156
Effects of Air Humidity and Initial Temperature on Content of Hydrogen Diffused in Deposited Metal of High Strength Steel		
镀锌钢板单脉冲与双脉冲点焊工艺性能比较	冀春涛,赵平,姜俊	159
Comparison Between Single Pulse and Dual Pulse Spot Welding Process Performances of Galvanized Steel		
AP1000 核电结构模块焊接变形控制	王磊	161
Control of Welding Deformation on Structure Module for AP1000 Nuclear Power Station		
焊接接头设计的工艺性研究	邱葭菲,王瑞权	164
Research on Manufacturability of Welded Joint Design		
焊接电流对 Ti3Al/TC11 焊接界面合金元素扩散及显微硬度的影响	刘莹莹,程晓峰,张勇召	167
Effects of Welding Current on Elements Diffusion and Microhardness of Ti3Al/TC11 Welding Interface		
罐体双枪自动焊设备的研制	宋金虎	170
Design of Automatic Welding Equipment with Two Guns for Tank		
焊接工艺对 Inconel 718 镍铬基合金管结构环焊缝残余应力和变形影响的有限元分析	夏成宇,马健,黄扬,等	172
FE Analysis on Residual Stress and Deformation of Inconel 718 Ni-Cr Based Alloy Tube Structure Girth Weld Beam Under different Welding Process		
基于 Nios II 控制的钨极氩弧焊送丝机控制系统设计	杨芙,张姝,张文明	176
Design of GTAW Wire Feeder Control System Under Nios II Control		
15CrMoR 燃烧炉室焊接工艺设计	吴静然	178
Discussion on Design of Welding Process for 15CrMoR Combustor		
热应力在 CO <sub>2</sub> 气体保护焊接小型工字梁结构时的演变规律	王玉仓,王向杰	180
Evolution of Thermal Stress in CO <sub>2</sub> Gas Shielded Welding of Small I-beam Structure		
电触头电阻钎焊中预置钎料的填缝过程	赵亚楠	183
Filling Process for Brazing Filler Metal in Electrical Contact Resistance Brazing		

- 汽车减振器支架焊接机器人系统的设计 ..... 张骥丰, 郑卫刚, 张琦 186  
Robot Welding System Design for Shock Absorber Bracket of Automobile
- 我国高速列车铝合金车体焊接变形控制方法研究现状 ..... 薛健, 刘团 188  
Research on Current State and Prospect of Welding Deformation and Deformation Control Methods for China's High-speed Train Aluminum Alloy Carbody
- Mg / Cu 异种材料共晶反应钎焊连接研究 ..... 王怀建, 袁苗达, 白莉 191  
Dissimilar Metals Between Copper and Magnesium Alloy in Eutectic Contacting Reaction Brazing
- Q345C 铲运机大臂的焊接工艺 ..... 张少伍, 范湘生, 贺龙明, 等 193  
Welding Process for Q345C Main Arm of Underground LHD
- 基于 RBF 神经网络的 FeO-MnO 渣系 ZGMn13 堆焊焊条的设计 ..... 杨莉, 李猛, 季男 196  
Design of FeO-MnO Slag System Hardfacing Electrode About ZGMn13 Based on RBF Neural Networks
- 扩散时间对 Al/Cu 真空扩散连接的影响 ..... 白莉 199  
Effects of Holding Time on Vacuum Diffusion Bonding of Al/Cu

## 切割技术 *Cutting Technology*

- 基于 FLUENT 的氧乙醇汽油割嘴内部流场分析 ..... 郝明, 胡传顺, 蒋应田 201  
Analysis on Oxygen Ethanol Gasoline Cutting Nozzle Internal Flow Field Based on FLUENT

## 失效分析 *Failure Analysis*

- 穿顶棚套管焊缝缺陷分析及处理 ..... 王志永, 王强, 黄永琪, 等 204  
Defects Reasons Analysis and Solutions About Weld of Casing Through Boiler Ceiling
- 电站锅炉吹灰器枪管断裂原因分析 ..... 孙涛, 冯砚厅, 柯浩, 等 206  
Analysis on Crack Reason for Sootblowers Barrel of Power Station Boiler
- BGA 焊点失效分析与改善 ..... 施纪红 208  
Failure Mode Analysis and Performance Improvement of BGA Welded Joint

## 模具设计 *Die Design*

- 精密垫圈落料冲孔复合模加工及装配 ..... 白西平 211  
Machining and Assembly of Piercing and Blanking Die for Precision Washer
- 连接套热挤压凸模的改进 ..... 王春华 214  
Improvement of Hot Extrusion Punch for Connecting Sleeve
- 壳体零件整形模的改进 ..... 康立业 216  
Improvement of Reshaping Die for Shell Parts
- 上击辊脱粒板冲孔切形模设计 ..... 田青松 218  
Piercing and Forming Die Design for Beater Threshing Plate
- 大型冲压模板的选材与加工 ..... 闫志波, 续永刚, 米燕涛 220  
Material Selection and Processing of Large Stamping Template
- 刃口可调的冲裁模设计 ..... 孙新, 文振华 222  
Design of Punching Dies with Adjustable Blade

## 生产应用 *Application*

- ZG45CrMo 大齿轮的修补工艺研究 ..... 段世新, 肖德政, 杨站东, 等 225  
Study on Repair Techniques of ZG45CrMo Large Gears
- 不锈钢管手工 TIG 焊摇摆法焊接工艺研究 ..... 王志红 226  
Welding Procedure Research of Stainless Steel Tube Manual TIG Welding Method of Swing
- 管板类锻件“反向锻造法” ..... 王建党 228  
Reversal Forging Method for Tube Plate Forgings

读者若发现本刊有印刷、装订质量问题, 请寄回编辑部调换。