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论文

脉冲电流作用下TIG焊接熔池行为的数值模拟

武传松;郑炜;吴林

山东工业大学连接技术研究所;济南,250061;哈尔滨工业大学材料科学与工程学院;哈尔滨,150001;哈尔滨工业大学材料科学与工程学院;哈尔滨,150001

摘要： 建立了脉冲TIG（TungstenInertGas）焊接熔池行为的数值分析模型，分析了脉冲电流对TIG焊接熔池流场、热场及熔池形状的影响规律计算结果表明：熔地体积对电流的脉冲作用较敏感；脉冲TIG焊接熔池内流体流动的主要驱动力是表面张力梯度；熔池中的流场随电流作周期性变化.利用自行研制的计算机视觉实验系统，测试了一个脉冲周期内熔池宽度的动态变化过程，计算值与测试值基本吻合.

关键词： 脉冲焊接 熔池 流场 热场

NUMERICAL SIMULATION OF TIG WELD POOL BEHAVIOR UNDER THE ACTION OF PULSED CURRENT

WU Chuansong (Institute of Joining Technology, Shandong University of Technologyl Jinan 250061)ZHENG Wei; WU Lin(College of Materials Science and Engineering, Harbin Institute of Technology Harbin 150001)

Abstract: A mathematical model is established for simulating the TIG(Tungsten Inert Gas) weld pool behavior in pulsed TIG welding. It was analyzed how the pulsed current affects the fluid flow and heat transfer in a TIG weld pool and the pool geometry. The computed results show that the volume of weld pool is sensitive to the action of pulsed currellt, the gradiellt ofthe surface tension is the main driving force for the fluid flow in pulsed TIG weld pool, andthe fluid velocity field changes periodically with the pulsed current. The computer vision-basedexperiment system is used to measure the varying process of the weld pool width in a ptilsedcycle. The predicted weld pool width is in agreement with the measured one.

Keywords: pulsed welding weld pool fluid flow temperature profile

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通讯作者:

作者简介:

作者Email:

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