

反应堆工程

铍/铝镁合金YAG激光焊接工艺及微观组织分析

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摘要 利用YAG激光焊接了铍/铝镁合金环, 探索出合理的焊接工艺参数, 采用扫描电镜及电子探针对铍/铝镁合金焊接接头的组织结构进行了研究。冷却速度对显微组织的形成影响明显, 在靠母材的焊缝两侧, 焊缝的显微组织为树枝晶, 而焊缝的中心为等轴晶; 在焊缝处主要存在焊接热裂纹及夹杂物, 对夹杂物的能谱分析表明, 其主要由C、O、Al、Mg、F、Cl等元素组成; 对焊缝的面扫描结果表明, C、O等元素在焊缝的表面存在偏析, 而Be与Mg分布较为均匀。

关键词 [铍; 铝镁合金; 激光焊接; 微观组织](#)

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Nd:YAG Laser Welding Technology and Microstructure of Be/Al-Mg Alloy

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Abstract Beryllium and Al-Mg alloy was welded by Nd:YAG laser. The reasonable welding parameter was obtained. The microstructure of beryllium and Al-Mg welding seam was analysed by means of X-ray energy spectrum, scanning electron microscope and electron probe microanalysis. The microstructure of welding seam is affected by cooling rates. The microstructure of welds consists of dendritic structure near melted line and equiaxed grain at the centerline of welding seam. Hot cracking and inclusion are main defects. These inclusions are formed by C, O, Al, Mg, F and Cl elements. The results of surface scanning show that C and O elements segregation exist surface layer of welding seam, on the other hand distribution of Mg and Be is uniformity.

Key words [beryllium](#) _ [Al-Mg alloy](#) _ [laser welding](#) _ [microstructure](#)

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