原子能科学技术 2003 37 (4 ): ISSN: 1000-6931 CN: 11-2044/TL

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# ADS结构材料在液态Pb-Bi合金中的腐蚀

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收稿日期 2002-8-7 修回日期 网络版发布日期:

摘要 概要综述了加速器驱动洁净核能系统(ADS)结构材料在液态Pb Bi合金中的腐蚀机理、影响因素及其防护技术。腐蚀机理主要是:1)材料组分元素在Pb Bi合金中的溶解和质量迁移;2)组分元素与Pb Bi合金中的杂质氧的化学反应;3)Pb Bi合金沿材料晶界渗透导致的晶界脆化。主要影响因素为:1)系统的温度和温差;2)Pb Bi合金中的氧含量;3)材料的化学成分;4)Pb Bi合金的流速。氧含量的控制与测量是防止材料腐蚀的重要技术环节,此外,材料表面处理及改性等防护技术有良好应用前景。

关键词 ADS Pb-Bi合金 腐蚀机理 影响因素 防护技术

分类号 TQ050.91



## Corrosion Behavior of Materials in Liquid Pb-Bi Eutectic

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**Abstract** The mechanism, influence factors and protection techniques of the materials corrosion in liquid Pb Bi eutectic are summarized in the paper. The main corrosion mechanism is: 1) the dissolution and mass transer of the composition elements of the materials in liquid Pb Bi eutectic; 2) the chemical reaction between the composition elements and oxygen in Pb Bi eutectic; 3) the intergranular boundary brittle resulting from the Pb Bi penetration along the intergranular boundary of the materials. The influence factors are as following:1) the temperature and the temperature differential in the system; 2) the oxygen content or oxygen part pressure in the system; 3) the chemical composition of the materials ; 4) the velocity of the Pb Bi eutectic.The controlling and measurement of the oxygen content in Pb Bi eutectic is a key technique for the prevention of the materials corrosion. Moreover, the treatment and modified of the materials surface will also have a good prospect for the prevention of the materials corrosion in Pb Bi eutectic.

**Key words** ADS Pb-Bi eutectic corrosion mechanism influence factor prevention technique

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通讯作者