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压力钎焊改善Si_3N_4/40Cr 钢接头强度的试验研究

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摘　要：　分析了Si_3N_4/40Cr钢钎焊接头缓冲层机制。利用压力钎焊促进缓冲层产生塑性变形，降低了接头的残余应力，提高了接头强度。软性缓冲层Cu和Nb易于产生较大的塑性变形，接头强度有明显提高；硬性缓冲层Ta不易产生塑性变形，接头强度无明显提高 。缓冲层塑性变形愈大，接头强度愈高。使用Cu作缓冲层材料，当外加压力为27 MPa时，接头拉伸强度可达62.3MPa。EPMA结果表明，在加压和无压状态下 ，接头中各元素在垂直界面方向上的总体分布不发生变化。加压可以减小接头钎缝宽度，控制接头间隙。压力钎焊也有助于其它异种材料的连接。

关键字：　Si_3N_4/40Cr钢　压力钎焊　残余应力　缓冲层

IMPROVEMENT OF Si_3N_4/40Cr STEEL JOINT STRENGTH BY PRESSURE BRAZING

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Abstract: The buffer mechanism in the Si_3N_4/40Cr steel joint was analyzed. Pressure brazing was employed to increase the joint strength by the plastic deformation of the buffer layer and the decrease of the residual stresses. The soft buffers such as Cu and Nb are apt to be deformed and result in increase of the joint strength, the hard buffers such as Ta are reversed. The larger the plastic deformation of the buffer layer, the higher the joint strength. As a result, the joint tensile strength is 62.3MPa with Cu as a buffer and 27MPa exterior pressure. It was drawn up from EPMA that the element distributions vertically along interface do not change whether with or without pressure and that the joining gaps decrease with pressure. Other dissimilar materials bonding can benefit by pressure brazing.

Key words: Si_3N_4/40Cr steel pressure brazing residual stress buffer

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