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Evaluation of Cu-Ag-Ce Alloys used as Filler Metals in Al_2O_3 Brazed Joints Pre-Metallized with Ti

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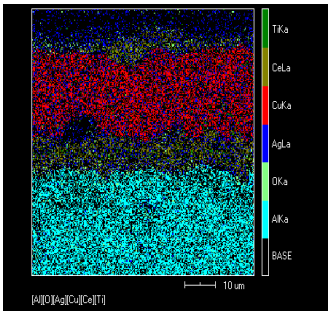
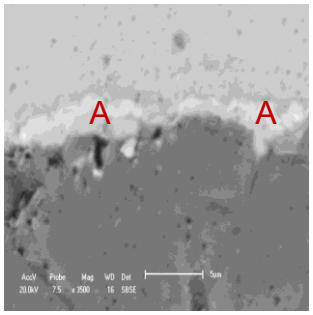
Abstract – *In this work $Cu_xAg_{45}Ce_x$ alloys obtained by melt-spinning process were evaluated as filler metal in Al_2O_3 brazed joint pre-metallized with Ti by plasma process For this joints using different Ti deposition time, brazing temperature and brazing time were submitted to flexure resistance test and chemical mapping in the brazed interface. The EDX analyses and the tapes flexibility indicated that tapes with 6 % Ce were completely amorphous being used as filler metals. Chemical mapping indicated that Ce had been participated as active metal in the brazing process reaching up to 170 MPa in the brazed joint flexure resistance values*

The most important advantages of the use of amorphous alloy as filler metals in brazing process is its flexibility which allow to be pre-positioned in irregular surfaces and its low thickness which avoid the use of high clearance in the joint (1). In this work Alumina cylinders pré-metallized with Ti by plasma process with different Ti deposition time were submitted to brazing process using different brazing temperature and time and a new amorphous $Cu_{49}Ag_{45}Ce_6$ tapes obtained by meltspinning process as filler metals. The joints were evaluated by 3 points flexural test. The joints obtained using greater Ti deposition (120 min) and less brazing time (1070 °C) or less Ti deposition time (60 min) and grater brazing temperature (1150 °C) presented the greater flexion resistance values (176,8 MPa and 167,8 MPa). The chemical maps presented the Ce participation in the union process, forming a uniform layer with Ti (figure 1a). Figure 1b presents an interface micrograph where can be observed the formation of a reaction layer with the presence of Ce as indicated trough (figure 2a) where can also be verified the presence of Cu and Al probably forming composed phases. The contribution of Ce in brazing process can be confirmed by the chemical map (figure 2b) which presented an interface with low flexion resistance values (120,3 MPa) where the Ce agglomeration with Ti is not intense. So, the results suggest that Ce has been participated not only to promote the tape amorphization process, improving the tape flexibility and homogeneity , but also as active element in the brazing process

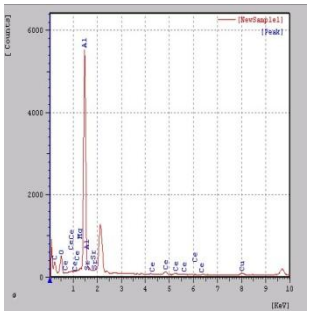


(a)

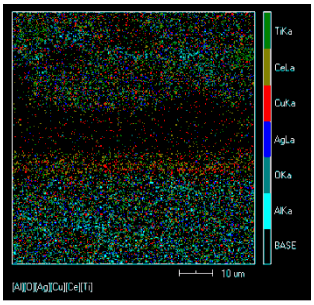


(b)

Figure 1- Chemical map of brazed interface with 176,8MPa of flexion resistance value (a) and the layer reaction at the interface (A) (b)



(a)



(b)

Figure 2 - Chemical analyses in point A of figure 1(b) (a) and chemical map of brazed interface with 120,3 MPa of flexion resistance value

(1) RABINKIN, A. **New Applications for Rapidly Solidified Brazing Foils.** Miami: Welding Journal, v. 68 (10), out. 1989. p. 39-46.

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