Ag-Cu and Bi-Cd Eutectics Ribbons under Superplastic Tensile Test Regime

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Abstract : Superplastic deformation is shown by materials with a fine grain size, usually less than 10 µm, when they are deformed within the strain rate range 10-5 10-1 s-1 at temperatures greater than 0.5Tm, where Tm is the melting point in Kelvin. According to the constitutive equation for superplastic flow, refinement of the grain size would be expected to increase the optimum strain rate and decrease the temperature required for superplastic flow. Ribbons of eutectic Ag-Cu and Bi-Cd alloys were manufactured by using a single roller melt-spinning technique to obtain a fine grain structure for later test in superplastic regime. The eutectics ribbons were examined by scanning electron microscopy and X-Ray diffraction, and the grain size was determined using the image analysis software ImageJ. The average grain size was less than 1 µm. Tensile tests were carried out from 10-4 to 10-1 s-1, at room temperature, to evaluate the superplastic behavior. The largest deformation was shown by the Bi-Cd eutectic ribbons, \mathcal{E} =140 %, despite that these ribbons have a hexagonal unit cell. On the other hand, Ag-Cu eutectic ribbons than Bi-Cd ribbons. This is because the Ag-Cu grew in a strong cube-cube orientation relationship. **Keywords :** eutectic ribbon, fine grain, superplastic deformation, cube-cube orientation

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