GLASS FORMING RANGES IN Y-Cu-Al TERNARY SYSTEM CALCULATED USING SEMI-EMPIRICAL MODELS

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A method based on the semi-empirical Miedema's and geometric model was used to calculate the glass forming ranges and glass forming abilities (GFA) in Y-Cu-Al ternary sytem and its sub-binaries. The formation enthalpies of amorphous alloys, of their crystalline (solid solution) counterparts and the difference between both energies were calculated indicating compositions close to Y-Al and Y-Cu sub-binaries as those with the highest GFA. From the normalized entropy change $\frac{S_\sigma}{k_B}$, the highest GFA was also predicted for sub-binaries close to Y-Cu. In both cases Y atoms play an important role, due to their significant atomic radius and highly negative interfacial enthalpies with other constituents. The $\Delta \mathrm{P}_{HS}$ parameter, which takes into account both, the enthalpy and entropy changes, indicates the range with highest GFA in the region of $\mathrm{Y_{40}Cu_{31}Al_{29}}$ alloy. The calculated results are in well agreement with experimental and other theoretical results.