

## Phase formation in rapid solidified Ag–Y alloys

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The phase formation in a rapidly solidified Ag–Y system was evaluated by means of two predictive amorphization criteria: the thermodynamic  $\gamma^*$  parameter and the new  $\lambda + \Delta h^{1/2}$  criterion. The former considers only the thermodynamic contribution, while the latter combines the effect of an atomic size mismatch between elements and their electronic interaction. The results showed a marginal glass-forming ability (GFA) with the best composition region for glass formation located near the Y-rich eutectic region. The melt-spun ribbon contained an amorphous matrix with a distribution of Y solid solution nanocrystals. Two new metastable phases found in the study were identified. One with an orthorhombic structure was precipitated during crystallization of the highest GFA alloy. The other having a hexagonal structure was formed under rapid solidification of the near-eutectic alloy lying between the  $\text{Ag}_{51}\text{Y}_{14}$  and  $\text{Ag}_2\text{Y}$  phases. The results also showed no improvement in the predictability of the  $\gamma^*$  and  $\lambda + \Delta h^{1/2}$  amorphization criteria when considering the metastable phases formed during crystallization. © 2013 American Institute of Physics.

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