

Non-isothermal crystallization kinetics metallic glass by differential fast scanning calorimetry

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The thermal stability and the kinetic fragility of Al₈₆Ni₆Y_{4.5}Co₂La_{1.5} (%wt.) metallic glass were investigated by ultra-fast non-isothermal thermal analysis. The differential fast scanning calorimeter (DFSC) traces revealed that the material undergoes a three-stage crystallization for heating rates ranged from 5 to 40,000 K/s. Combining DSC and DFSC, the kinetics of the glass transition and crystallization of Al₈₆Ni₆Y_{4.5}Co₂La_{1.5} metallic glass was investigated. The Kissinger plot can express the temperature dependence of growth rate of this metallic glass. Furthermore, the kinetic fragility for Al₈₆Ni₆Y_{4.5}Co₂La_{1.5} metallic glasses is evaluated. Depending on the fragility index, this metallic glass is a liquid of very high fragility, similar to several organics.