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Influence of minor additions of Si on the crystallization kinetics of $\text{Cu}_{55}\text{Hf}_{45}$ metallic glasses

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Highlights

- Crystallization kinetics are studied by means of isothermal and non-isothermal heating.
- The small additions of Si shifted the glass transition and crystallization events to higher temperatures.
- The activation energy reached its maximum values at 0.5 at. % of Si and then tended to decrease.

ABSTRACT

By means of differential scanning calorimetry the effects of minor additions of silicon on the crystallization kinetics of $\text{Cu}_{55-x}\text{Hf}_{45}\text{Si}_x$ ($x = 0, 0.5, 1.0$ and 2.0 at. %) alloys were studied. In the non-isothermal crystallization mode, the Kissinger method was used to obtaining the apparent activation energies of glass transition and crystallization. The highest E_g , E_x and E_p experimental values were found at 0.5 at. % of silicon i.e. $E_g = 897.20$ kJ/mol, $E_x = 516.41$ kJ/mol and $E_p = 490.22$ kJ/mol. In the isothermal mode, the Johnson-Mehl-Avrami model was employed in order to determine the crystallization kinetics, whilst

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