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Liquid-Liquid Transitions in Strontium Tellurite Melts

Authors : Rajinder Kaur, Atul Khanna

Abstract : Transparent glass-ceramic and crystalline samples of the system: xSrO-(100-x)TeO2; x = 7.5 and 8.5 mol% were prepared by quenching the melts in the temperature range of 700 to 950oC. A very interesting effect of the temperature on the glass-forming ability (GFA) of strontium tellurite melts is observed,and it is found that the melts produce transparent glass-ceramics when it is solidified from lower temperatures in the range of 700-750oC, however, when the melts are cooled from higher temperatures in the range of 850-950oC, the GFA is significantly reduced andanti-glass and/or crystalline phases are produced on solidification.The effect of temperature on GFA of strontium tellurite melts is attributed to short-range structural transformations: TeO_4□TeO_3 which procceds towards the right side with an increrase in temperature. This isomerization reaction lowers the melt viscosity and enhances the crystallization tedendency. It is concluded that the high-temperature strontium tellurite meltsfreeze faster into crystalline phases as compared to the melts at a lower temperature; the latter supercooland solidify into glassy phases.

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