

Collective dynamics in supercooled glass-forming aluminium-based melts

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The point of phase transition in a substance, despite its exceptional influence on the behavior of a substance, is not special for its thermodynamic functions [1]. Any phase can exist, at least as metastable, and on the other side of the transition point; thermodynamic inequalities at this point are not violated within the relaxation time. Preliminary analysis of metastable fluids [2] revealed features in the region of phase transitions for two-particle motion correlators [2, 3], describing the collective dynamics of particles in various models of particle interactions.

In this particular work, the temporal behavior of motion correlators observed in deep supercooled state of aluminium-based melts near glass-transition temperature [4, 5]. The analysis shows a change of dynamical structure till the relaxation processes of vitrification and gives vitrification temperature which consistent with volumetric and other analysis methods [6].

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