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Yue, Yuanzheng

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Observation and understanding of fragile-to-strong transition in supercooled metallic and oxide liquids

Yuanzheng Yue

Department of Chemistry and Bioscience, Aalborg University, DK-9000 Aalborg, Denmark

Abstract:

The slow dynamics of glass-forming liquids is a complex subject of the condensed matter science. But the discovery of the fragile-to-strong (F-S) transition in some supercooled liquids upon cooling makes this subject even more complex since it is extremely challenging to directly probe the structural, topological and thermodynamic changes causing this transition. In this presentation, I first describe the phenomenology of the F-S transition and the approach to detect it by taking several metallic liquids and extremely poor glass-forming oxide liquids as examples. Then we present our recent understanding of the F-S transition by discussing its link to both the structural change and the relaxation behavior in supercooled liquids during cooling. Finally, we point out some challenges and perspectives in clarifying the origin and consequences of the fragile-to-strong liquid transition.

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