Viscosity of supercooled water and two-state interpretation of water anomalies

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Key words: Supercooled water, Viscosity measurement, Differential Dynamic Microscopy

Although being a familiar liquid, water exhibits many anomalies, that are magnified in supercooled water (*i.e.* kept liquid below its melting point). Lowering as much as possible the volume of the sample allows reaching the lowest temperatures without crystallisation of the supercooled liquid. That is why microfluidics is particularly relevant to the study of supercooled water.

Until recently viscosity data in supercooled water were scarce [1]. We report two new viscosity experiments: one based on Brownian motion and performed at atmospheric pressure down to -34°C [2]; the other based on Poiseuille flow performed up to 300 MPa and down to 20°C below the melting line [3]. An extension of a quantitative two-state model [4] allows us to consistently describe dynamic properties of supercooled water.

References

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