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Temperature dependence of the configurational entropy of a glass-forming melt

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The temperature dependence of viscosity of liquids is an important topic both for glass physicists and for glass technologists. To describe such dependence, numerous theoretical models have been proposed in literature over the past century. However, all these models exhibit weakness in terms of precision and physical foundations. The sources of such weakness are discussed here by considering the thermodynamic aspects of these models. Several widely used viscosity equations have been rearranged to derive a mathematical function describing the relation between the configurational entropy and temperature. It is found that such function is rather different between different viscosity models. It is this function that determines the extent of the suitability of viscosity models in describing the viscosity-temperature relationship of a glass-forming liquid. In this work it is revealed different viscosity models can be linked to one another through the configurational entropy.