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- An Invited Talk

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Sub-T_g enthalpy relaxation in an unstable oxide glass former: insights into the structural heterogeneity

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Structural heterogeneity plays a crucial role in determining functionality of glasses. In this work we have found that the sub-T_g enthalpy relaxation pattern in a hyperquenched glass is highly sensitive to structural heterogeneity. As a consequence, the former can be used as an effective approach to detect and quantify the structural heterogeneity in glass-forming liquids. However, the chemical nature of structural heterogeneity should be revealed by other means such as high resolution microscopic and spectroscopic methods. To study the impact of the structural heterogeneity on the sub-T_g relaxation we chose the glass compositions with very different glass stabilities to crystallization. By using hyperquenching-annealing-calorimetry approach, we have observed that the pattern of calorimetric response below T_g dramatically varies with glass composition. The variations are attributed to different chemical features and degrees of structural heterogeneity in glass-forming liquids. This finding contributes to the microscopic origin of both the primary and secondary relaxation in terms of structural heterogeneity. Finally the results provide insights into the relation between structural heterogeneity and nucleation in glass.