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Fast Scanning Calorimetry study of non-equilibrium relaxation in fragile organic liquids[1] VLAD SADTCHENKO, DEEPANJAN BHATTACHARYA, LIAM O'REILLY, The George Washington University — Fast scanning calorimetry (FSC), capable of heating rates in excess of 1000000 K/s, was combined with vapor deposition technique to investigate non-equilibrium relaxation in micrometer thick viscous liquid films of several organic compounds (e.g.2-ethyl-1-hexanol, Toluene, and 1-propanol) under high vacuum conditions. Rapid heating of samples, vapor deposited at temperatures above their standard glass softening transition (Tg), resulted in observable endotherms which onset temperatures were strongly dependent on heating rate and the deposition temperature. Furthermore, all of the studied compounds were characterized by distinct critical deposition temperatures at which observation of endotherm became impossible. Based on the results of these studies, we have developed a simple model which makes it possible to infer the equilibrium enthalpy relaxation times for liquids from FSC data. We will discuss implications of these studies for contemporary models of non-equilibrium relaxation in glasses and supercooled liquids.

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