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Influence of Hydrogen Bonding on the Kinetic Stability of Vapor Deposited Triazine Glasses AUDREY LAVENTURE, University of Montreal; University of Wisconsin-Madison, ANKIT GUJRAL, University of Wisconsin-Madison, OLIVIER LEBEL, Royal Military College of Canada, CHRISTIAN PELLERIN, University of Montreal, MARK D. EDIGER, University of Wisconsin-Madison — Physical vapor deposition (PVD) can produce glasses with enhanced kinetic stability, high density and anisotropy. However, the influence of hydrogen bonding on these properties has not been fully explored. We vapor deposit a series of triazine derivatives containing functional groups with different H-bonding capability, i.e. NHMe (H-bond donor), OMe (H-bond acceptor) and Et (none) using a wide range of substrate temperatures, from 0.60 to 1.05T_g. PVD glasses of the NHMe derivative have inferior kinetic stability compared to its OMe and Et analogues. This behavior can be rationalized by the higher average number of bonded NH per molecule found in PVD glasses of the NHMe derivative, as quantified by infrared spectroscopy (IR). Despite this difference in H-bonding, IR and wide angle X-ray scattering reveal that all three compounds show a tendency to orient parallel to the substrate at low substrate temperatures. Our results support the hypothesis that strong intermolecular interactions, such as H-bonds, can hinder mobility of the molecules at the interface and thus limit their possibility to sample the potential energy landscape to produce stable glasses.

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