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Preparing anisotropic glasses from structural analogs of liquid crystal formers by physical vapor deposition JARITZA GOMEZ, MARK EDIGER, University of Wisconsin - Madison — Physical vapor deposition (PVD) can be used to tune molecular orientation in glasses by depositing at substrate temperatures ($T_{substrates}$) just below the glass transition temperature (T_g). Glasses of a smectic A liquid crystal (LC) former, itraconazole, deposited at a $T_{substrate} = T_g$ have been shown to inherit the structure of the equilibrium smectic liquid and orient nearly perpendicular to the substrate. Here we report the deposition of glasses prepared from molecules that are structural analogs to known LC formers: posaconazole and a functionalized perylenemonoimide (PMI), analogs to itraconazole and a previously reported columnar LC, respectively. Spectroscopic ellipsometry and infrared spectroscopy are used to characterize average molecular orientation in the as-deposited glasses. Surprisingly, we find that molecular orientation in glasses of posaconazole deposited at different $T_{substrates}$ does not follow the previously observed trends for linear molecules without LC states, but more closely follows itraconazole. In addition, we find that glasses deposited at T_g are not isotropic, even though liquid-cooled glasses do not show preferential molecular orientation. Similarly, glasses from a functionalized PMI, structural analog to a known columnar LC, show molecular orientation at $T_{substrate} = T_g$. These results may provide insights into the mechanism by which physical vapor deposition can produce glasses with tunable molecular orientation.

Jaritza Gomez
University of Wisconsin - Madison

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