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Molecular Orientation in Two Component Vapor-Deposited Glasses: Effect of Substrate Temperature and Molecular Shape CHARLES POWELL, Department of Chemistry, University of Wisconsin-Madison, JING JIANG, Department of Polymer Science and Engineering, School of Chemistry and Chemical Engineering, Nanjing University, DIANE WALTERS, MARK EDIGER, Department of Chemistry, University of Wisconsin-Madison — Vapor-deposited glasses are widely investigated for use in organic electronics including the emitting layers of OLED devices. These materials, while macroscopically homogenous, have anisotropic packing and molecular orientation. By controlling this orientation, outcoupling efficiency can be increased by aligning the transition dipole moment of the light-emitting molecules parallel to the substrate. Light-emitting molecules are typically dispersed in a host matrix, as such, it is imperative to understand molecular orientation in two-component systems. In this study we examine two-component vapor-deposited films and the orientations of the constituent molecules using spectroscopic ellipsometry, UV-vis and IR spectroscopy. The role of temperature, composition and molecular shape as it effects molecular orientation is examined for mixtures of DSA-Ph in Alq_3 and in TPD. Deposition temperature relative to the glass transition temperature of the two-component mixture is the primary controlling factor for molecular orientation. In mixtures of DSA-Ph in Alq_3, the linear DSA-Ph has a horizontal orientation at low temperatures and slight vertical orientation maximized at $0.96T_{g,mixture}$, analogous to one-component films.

Charles Powell
Department of Chemistry, University of Wisconsin-Madison

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