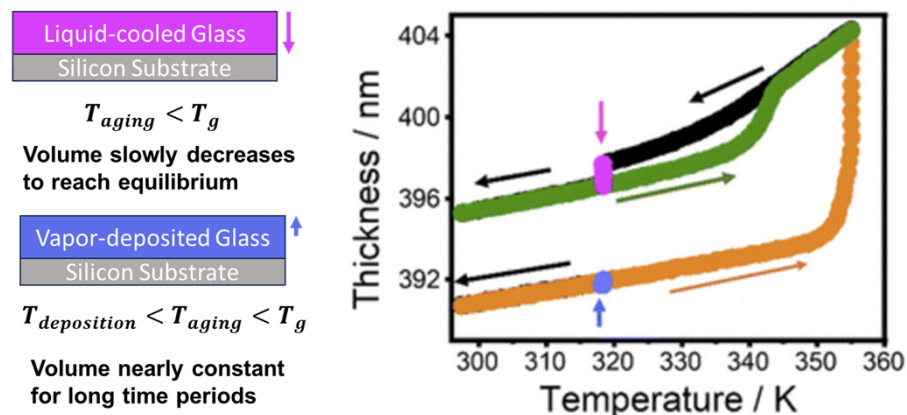


Physical Aging of Organic Semiconductor Glasses

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Organic semiconductors are essential materials for electronic devices. Glasses prepared from organic semiconductors are used for the light-emitting diode (OLED) displays of every modern cell phone. Because glasses are out of equilibrium, their properties can change over time, in a process known as physical aging.

Wisconsin MRSEC IRG 1 researchers used three experimental techniques to characterize physical aging in organic semiconductor glasses. They showed that producing the glasses by physical vapor deposition can reduce the impact of aging by at least a factor of 10. In addition, they showed that routine laboratory measurements on bulk samples can provide reliable predictions for physical aging in the very thin films used in OLED displays. These results are relevant for OLED displays as glass stability is key to maintaining high efficiency, and they advance our MRSEC IRG goal to control mobility to create glasses with desirable properties.



(left) A normal, liquid-cooled glass shrinks when heated in a phenomenon called aging. In contrast, an ultrastable, vapor-deposited glass stays the same size. (right) Experimental measurement of the sample thickness as a function of temperature for a vapor-deposited film in orange and a liquid-cooled glass in green.