Altering Glass Transition of TPD thin Films with UV Light

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N,N´-Bis(3-methylphenyl)-N,N'dyphenilbenzidine (TPD) is a hole-transport material used in electroluminescent devices whose glass transition temperature, Tg, depends on the film thickness.[1] For sufficiently thin films (d<30 nm), dewetting of amorphous TPD films deposited on a on fused-silica or an ITO substrate occurs even at room temperature.[2] Following a brief report on increased thermal stability of UV irradiated TPD films,[3] we investigated the underlying mechanism responsible for it. From proton NMR and mass spectrometry measurements, coupled with morphology (AFM) and spectroscopy (UV-VIS) studies, we find that photo-excited TPD species react with oxygen in air. This leads to partially oxidized TPD films whose increased thermal stability we ascribe to stronger hydrogen bonding of photo-oxidized TPD species with hydrophilic substrates.

REFERENCES

1. Suljovrujic, E., *et al*., *Applied Physics Letters* **88**, 121902 (2006).
2. Yase, K., et al., *Thin Solid Films* **273,** 218-221 (1996).
3.. Qiu, Y., and Qiao, J., *Thin Solid Films* **372**, 265-270 (2000).