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Ellipsometric study of an organic template effect: H₂Pc/PTCDA

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Abstract

A key prerequisite for fabricating opto-electronic devices with organic molecules is to control the molecular growth mode. In this work we present an ellipsometric study of the templating effect of 3,4,9,10-perylene tetracarboxylic dianhydride (PTCDA) on the growth mode of metal free phthalocyanine (H₂Pc). The difference in the anisotropic dielectric function between the H₂Pc films grown on bare glass or silicon substrates compared to the anisotropic dielectric function of H₂Pc films grown on PTCDA indicates a drastic change in molecular orientation. From the strong in-plane/out-of-plane anisotropy the average molecular tilt angle of H₂Pc was found to be around 52° for the films grown on bare substrates and around 25° for H₂Pc films grown on PTCDA. A splitting in the H₂Pc Q-band was observed for the H₂Pc films grown on PTCDA which indicates a deviation from the perfect H₂Pc α -phase crystal.

Keywords: Ellipsometry; Anisotropy; Dielectric function

PACS classification codes: 81.15.Ef; 68.55.Jk