

The role of desorption on the surface dynamics of molecular organic thin films

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Scaling laws and rate equations are common tools for analysing quantitatively the mechanism of growth of thin films. Many kinetic models have been proposed taking into account the role of the deposition rate of molecules on the substrate surface, their diffusion and their possible desorption. Within this frame, a strong simplification (and approximation) of the model is achieved when considering a regime of complete condensation, i.e. neglecting the possibility of re-evaporation of the deposited molecules. Here, the role of desorption in thin film preparation of molecular materials of relatively small organic molecules physisorbed on inert surfaces is discussed and some examples demonstrating its effects on the film morphology, e.g. nucleation rate and size distribution of nuclei, are reported. Moreover, the prediction of thermodynamics for the quaterthiophene/silica system are compared with the results of approximated kinetic models, providing a quantitative description of desorption.