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Temperature dependence in metal/organic heteroepitaxy GEOFFREY ROJAS, XUMIN CHEN, DONNA KUNKEL, University of Nebraska-Lincoln, MATHIAS BODE[1], Argonne National Laboratory, AXEL ENDERS, University of Nebraska-Lincoln, UNIVERSITY OF NEBRASKA-LINCOLN COLLABORATION, ARGONNE NATIONAL LABORATORY COLLABORATION — The nucleation and growth of 2D single layers of tetraphenyl porphyrin molecules on Ag(111) are studied with variable temperature scanning tunneling microscopy. The heteroepitaxy of the organic/metal thin film occurs in strict analogy with known processes of metal heteroepitaxy. A similar heirarchy of energetic barriers to diffusion along edges and around corners is established. Temperature is the key component to selectively activating these barriers and determining shape of the adislands, from fractal-like shapes at low temperature to compact shape at high temperatures. Using existing models of metal heteroepitaxy, the terrace diffusion and binding energies of tetraphenyl porphyrin are approximated from measurement of island size as a function of temperature. This study provides evidence of the validity of using existing models of metal heteroepitaxy for the description of organic/metal heteroepitaxial systems.

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