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Structure and Phase Transitions of Vapor-Deposited C32 Films[1]

V. DEL CAMPO, E.A. CISTERNAS, I. VERGARA, T. CORRALES, U.G. VOLKMANN, P. U. Catolica Chile, M. BAI, S.-K. WANG, H. TAUB, U. Mo.-Columbia, H. MO, S.N. EHRLICH, Brookhaven Nat. Lab — We have compared the structure, topography, and phase transitions of dotriacontane films (n-$C_{32}H_{66}$ or C32) that have been vapor-deposited onto a SiO_2-coated Si(100) wafer with those that have been deposited from solution. X-ray reflectivity measurements indicate that the as-deposited films differ in their morphology but share the following structural features at room temperature: adjacent to the substrate there is a nearly complete bilayer in which the molecules are oriented with their long axis parallel to the surface. Above the parallel film are partial layers of molecules oriented perpendicular to the surface. After a heating cycle above the bulk C32 melting point (T_b), AFM images of all films show the presence of 3D mesa-shaped bulk particles. On a second heating, AFM reveals the same succession of phase transitions for both film types in which a perpendicular monolayer spreads outward from the mesa-shaped particles below T_b followed by a delayering transition to a 3D fluid droplets just above T_b.[2]

[2]M. Bai *et al.*, Europhys. Lett. **79**, 26003 (2007).

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