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Nanoscale Observation of Alkane Dewetting[1] MENGJUN BAI, KLAUS KNORR, MATTHEW SIMPSON, SVEN TROGISCH, HASKELL TAUB, U. Mo.-Columbia, ULRICH VOLKMANN, P. U. Católica Chile, FLEMMING HANSEN, Tech. U. Denmark — To investigate the structure, morphology, and wetting of both solid and liquid films of an intermediate-length alkane, we have conducted Atomic Force Microscopy measurements in the noncontact mode on dotriacontane (n-$C_{32}H_{66}$ or C32) films deposited from a heptane solution onto SiO_2-coated Si(100) wafers. At low coverages after annealing, the C32 film consists at room temperature of isolated bulk particles situated above one to two layers of molecules oriented with their long axis parallel to the surface. For such samples, we find a narrow temperature range close to the bulk C32 melting point T_b in which a monolayer with C32 molecules oriented perpendicular to surface is stable. This perpendicular monolayer phase undergoes a dewetting transition to a three-dimensional (3D) fluid phase on heating to just above T_b and to a 3D crystalline phase on cooling to a few degrees below T_b. We summarize our results in terms of an equilibrium phase diagram that provides a useful framework for interpreting the unusual spreading and receding behavior that we observe for the perpendicular monolayer phase..

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