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**Relation between Packing Density and Thermal Transitions of Alkyl Chains on Layered Silicate and Metal Surfaces** HENDRIK HEINZ, University of Akron, RICHARD A. VAIA, BARRY L. FARMER, Air Force Research Laboratory, WPAFB — Characterization through experiment and simulation shows that the orientation of the alkyl layers and reversible phase transitions on heating are a function of the cross-sectional area of the alkyl chains in relation to the available surface area per alkyl chain (packing density). On even surfaces, a packing density less than 0.2 leads to nearly parallel orientation of the alkyl chains on the surface, conformational disorder, and no reversible melting transitions. A packing density between 0.2 and 0.75 leads to intermediate inclination angles, semi-crystalline order, and reversible melting transitions on heating. A packing density above 0.75 results in nearly vertical, lattice-like alignment of the surfactants on the surface and no reversible melting transitions. The same principle applies to curved surfaces, taking into account a local radius of curvature and a distance dependent packing density on the surface. The chain length (minimum C10) and interface chemistry have little impact on this behavior but determine chemical functionality and transition temperatures.

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