

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Melting of Linear Alkanes between Swollen Elastomers and Solid Substrates¹ ALI DHINOJWALA, The University of Akron, KUMAR NANJUNDIAH, Dow Chemical Company — We have measured the melting and freezing behavior of linear alkanes confined between a poly(dimethylsiloxane) (PDMS) elastomer and a solid sapphire substrate. For shorter alkanes (15 and 17 carbons) the interfacial layer has a higher melting temperature (T_m) than the majority of the alkane crystals inside the swollen PDMS elastomer. For longer alkanes (19, 21, and 22 carbons), a large depression in T_m was observed and the crystallization takes place outside the contact region first and then proceeds to the PDMS-sapphire boundary. In heating, the sapphire/alkane interface shows a pre-melting layer (or melts first) before the melting of a thicker alkane layer next to the sapphire surface. The observation of this unusual depression of T_m of the interfacial layers was unexpected and these findings have important implications in understanding friction and adhesion of soft elastomeric materials.

¹National Science Foundation

Ali Dhinojwala
The University of Akron

Date submitted: 15 Nov 2012

Electronic form version 1.4