

UNH Materials Science Seminar

11:10-12:00, Thursday, April 3, 2008

Kingsbury Hall S145

University of New Hampshire

Designing Superoleophobic Surfaces

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In the pursuit of producing surfaces that exhibit superhydrophobicity (equilibrium water contact angles greater than 150° and low contact angle hysteresis), we and others have relied on the understanding that a proper combination of *surface energy* and *roughness* (on the micron and nanoscale) imparts enhanced repellency in contact with a high surface tension liquid such as water ($\gamma_{lv} = 72.1$ mN/m). However there has been no similar level of understanding of what is required to produce superoleophobic surfaces, i.e. for liquids with much lower surface tensions such as decane ($\gamma_{lv} = 23.8$ mN/m) or octane ($\gamma_{lv} = 21.6$ mN/m). Previous calculations suggest that creating such a surface would be impossible as it would require a surface energy lower than any known solid substance. In this presentation, a third factor, *surface curvature*, will be discussed, in the context of combining it synergistically with surface chemistry and roughness in the design the first truly superoleophobic surfaces (exhibiting low hysteresis and contact angles greater than 160° with both decane and octane).

Host: Professor Marshall Ming