

Seminar: Crumpling, Folding, and Snapping Films

Monday, 20 July 2009

Last Updated Saturday, 01 August 2009

Dear All

Douglas Holmes, a visitor from U. of Massachusetts, will talk about many interesting experiments with polymer films. The seminar will take place on Tuesday, July 21, at 12:50 pm in the Physics Department of Universidad de Santiago (3rd floor, seminar room). Since it is the winter break in USACH, please use the back door to enter the building.

Best regards, Enrique.

"This work focuses on understanding deformation mechanisms and responsiveness associated with folding, crumpling, and snapping of thin polymer films attached to patterned and nonpatterned substrates. By studying folding and crumpling

in confined regimes, we gain insight into material properties, while developing new strategies for adhesive, optical, and patterning applications. Using a novel processing technique, microarrays of freestanding polydimethylsiloxane plates are placed in equibiaxial compression and transition through crumpled morphologies that are difficult to attain through traditional patterning techniques. The microstructures also change their curvature through a snap-through instability via environmental stimuli. When triggered via osmotic pressure the snap transition time scales as the square of the plate thickness and the inverse of the plate modulus. Recently, we have transferred this knowledge into the crumpling of ultrathin polymer films. We have fabricated sharply folded films directly on fluid, elastomeric, and silicon substrates. The films initially wrinkle with a predictable wavelength before collapsing into folds. The fold width scales directly with the film thickness and applied strain. We find that normally brittle, polystyrene films can accommodate excessive compressive strains without fracture by undergoing strain-localizing fold events"