

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Quantification of Folding in Sheet-like Nanostructures DURGESH RAI, GREGORY BEAUCAGE, RAMANTH RAMACHANDRAN, SIDDHARTH PRADHAN, University of Cincinnati — Two-dimensional nanostructures are of interest to a wide range of scientists from biologists interested in membranes to polymer scientists producing grapheme reinforced nanocomposites. Considering two-dimensional structures as a class of nanomaterials, we could use the sheet thickness and lateral size as structural description. In addition to these parameters, two-dimensional structures are, at times, capable of folding or crumpling, largely depending on the interfacial chemistry and to some extent on thermodynamics. We have studied this crumpling behavior using small-angle neutron and x-ray scattering in a range of nano-materials, specifically, membrane bilayers, graphene oxide, as well as exfoliated nano-sheets of molybdenum sulfide, boron nitride, and tungsten sulfide. A new parameterization of crumpling in these two-dimensional nanostructures will be described with indications of how this quantification can lead to general categories of crumpling behavior that differ in the systems mentioned above. (A helpful discussion with Fyl Pincus assisted with this work.)

Durgesh Rai
University of Cincinnati

Date submitted: 23 Nov 2011

Electronic form version 1.4