

Abstract:

Spontaneous instability and subsequent morphological evolution of a thin polymer film results in the formation of various meso scale features. These features are often random, lacking long range order limiting their utility in most practical settings. We have been working on aligning these patterns by dewetting them on topographically patterned substrate. In this work I will share some of our recent work on this topic and focus particularly on how the geometry (periodicity and height) of the substrate features influence the ordering. We will also address a few critical issues related to sample preparation, particularly what is the precise morphology of a thin film directly spin coated on to a topographically patterned substrate and subsequently show that the initial morphology of the film plays a significant role in determining the final morphology of the dewetted features. I will also discuss briefly some of our other recent ongoing work on evaporation of a polymer drop from a dissolving substrate, which has provided some new insight on stick slip motion.

Biography:

Dr. Rabibrata Mukherjee is an Assistant Professor at the Department of Chemical Engineering at Indian Institute of Technology Kharagpur. He obtained his B. E from Jadavpur University (1994), M. Tech from IIT, Kharagpur (2003) and Ph. D from IIT, Kanpur (2007), all in Chemical Engineering. Prior to joining IIT Kharagpur in May, 2009, he was a Scientist at Central Glass & Ceramic Research Institute, Kolkata, India. His research interest includes: Self organized hierarchical structure formation; Instability, dynamics and evolution of thin films; Electro hydrodynamic lithography; Particle arrays, Soft lithography etc. So far, he has published 15 papers in peer reviewed journals, 3 book chapters and has received more than 100 citations in his short academic career. He holds 1 US and 3 Indian Patents. He was a short term visiting scientist at the Cavendish Laboratory, University of Cambridge in 2007 and a Visiting Professor in the Department of Polymer Engineering at University of Akron, USA in 2011. He received the CSIR Young Scientist Award in 2007, the Shah Schulman Best PhD thesis award from IITChE in 2008 and the "Samsung Global Research Outreach" award in 2010, which was the first and only instance that the award came to an Indian academic Institute.