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Directed Morphology of Nanofilled Polymer Films on Flexible Substrates DIYA BANDYOPADHYAY, ARZU HAYIRLIOGLU, MANISH KULKARNI, ALAMGIR KARIM, Department of Polymer Engineering, The University of Akron, Akron, OH, USA — We demonstrate viable meso-patterning techniques that have relevance to electronics and organic photovoltaic applications via tunable control of polymer thin film instabilities. To this end, we examine the influence of fullerene (C_{60}) nanoparticles on multicomponent polymer thin films on patterned and flexible polydimethylsiloxane substrates and compare these results to morphologies on hard silica xerogel substrates of variable roughness and surface energy. Controlled incorporation of nanoparticles (NPs) can be used to tune polymer thin film instabilities and morphology. At NP concentrations below a threshold value, we observe directed dewetting of blend thin films consisting of uniformly aligned dewet domains that mimic the periodicity of the confining media, consistent with our previous experiments where it was observed that C_{60} NPs preferentially segregate to a PS/PB blend interface up to a certain saturation concentration.

Arzu Hayirlioglu
Department of Polymer Engineering,
The University of Akron, Akron, OH, USA

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