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Graphoepitaxy of diblock-copolymers microdomains with chemical patterns¹ ANTONIO CHECCO, BENJAMIN M. OCKO, MATTHEW MISNER, JI XU, THOMAS P. RUSSELL, BROOKHAVEN NATIONAL LABORATORY COLLABORATION, POLYMER SCIENCE AND ENGINEERING DEPARTMENT, UNIVERSITY OF MASSACHUSETTS, AMHERST COLLABORATION — Topographically patterned substrates have been used in recent years to laterally confine diblock copolymer (DBC) thin films in order to induce long-range lateral order of the DBC microdomain lattice with respect to a macroscopic reference. Here we demonstrate that surfaces with pure chemical patterns can be used to confine laterally diblock copolymers thin films through template-induced dewetting. A thin DBC film (PS-PEO) is spun cast on top of a surface chemically patterned with micron-sized, wettable domains prepared by oxidative nanolithography. Subsequently, annealing is used to direct the dewetting of the thin film into regions which are conformal to the patterns. We investigate the conditions (film thickness, annealing time) necessary to obtain dewetted structures reproducing the pattern shape with a high level of fidelity. In addition, we study the effect of pattern shape and size on the long-range order of DBC microdomains.

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