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Manipulation of surface crystalline structures of ultrathin PEO films using supercritical carbon dioxide[1] SO KING LAM, MITSUNORI ASADA, PETER GIN, MAYA ENDOH, TADANORI KOGA, Stony Brook University, SUSHIL SATIJA, NIST — Crystallization of polymeric materials in nanoconfined geometries has attracted considerable attention in the past decade. In this talk, we will present the effect of supercritical carbon dioxide as an environmentally "green" alternative to typical external fields, i.e. high temperature annealing, to control the melting/crystallization behavior of semicrystalline polymer thin films. Poly(ethylene oxide) (PEO) thin films with thickness of 10nm-100nm were used for this study. Various $scCO_2$conditions, including the density fluctuation ridge where anomalous plasticization effects can be observed in various polymer thin films, were applied to the PEO thin films. The surface structures before and after exposure were then investigated by using atomic force microscopy and grazing incidence small angle X-ray scattering and diffraction techniques. The results clearly showed the surface crystalline structures could be altered significantly by the use of $scCO_2$.

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