

Solvent quality influences surface structure of glassy polymer thin films after evaporation

The structural effects of treating a glassy polymer thin film with solvents of varying quality and subsequently evaporating the solvent are investigated. Molecular dynamics simulations are used to study both a monodisperse and a polydisperse film for poor to good solvent conditions, including the limit in which the polymer film is fully dissolved. The dissolved polymer-solvent mixtures form a polymer-rich skin, in agreement with previous studies. The IRG-2 team found that for non-dissolved films, the surface width of the film after solvent evaporation is enhanced compared to the case without solvent. The increased surface width is preserved after solvent evaporation for both mono- and polydisperse films, due to the kinetic arrest of the surface structure. The team's results show that it is important to take poor solvent effects into account for the surface morphology of already formed thin glassy films, an effect that is often neglected.

A. Statt, M. P. Howard, and A. Z. Panagiotopoulos, J. Chem. Phys. **147**, 184901 (2017).

A. Statt, M. P. Howard, and A. Z. Panagiotopoulos (IRG-2)
Princeton University

