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Dynamics of complicated phase behavior in ultrathin film of polymer blend by in situ AFM¹ TONGFEI SHI, YONGGUI LIAO, LIJIA AN, Changchun Inst. of Applied Chemistry, Chinese Academy of Sciences — The stability of polymer films is important for many applications. There are many reports on dewetting of polymer films, but most of them focused on dewetting behavior of single-component polymer films. In the phase-separated regions, reports suggest the formation of bilayer via phase separation, followed by the dewetting of the upper layer, which we call phase separation/bilayer-dewetting mechanism. Recently, it was theoretically predicted that a film of a binary miscible polymer blend can dewet on a solid substrate. In this work, we present first direct experimental observations of this dewetting dynamics, driven by a composition fluctuation, of ultrathin films of PMMA/SAN blend in miscible region by in situ AFM, and then the dynamics of the complicated dewetting and phase behavior of this ultrathin film in two-phase region, which is not the phase separation/bilayer-dewetting mechanism, but the dewetting of the film is followed by the phase separation in the droplets, coupling with the wetting of the substrate by the PMMA extracted by the strong attractive interaction between PMMA and the substrate, which we call dewetting-phase separation/wetting mechanism.

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