

Abstract Submitted
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Criticality of morphological instability of a strained film growing on a patterned substrate¹ HANGYAO WANG, FENG LIU, University of Utah
— We show that the morphological instability of a strained film on a patterned substrate is fundamentally different from that on a flat substrate. It exhibits a film thickness (t) dependent critical wavelength, which takes a simple form as $\lambda_c = \lambda_0/2 + \pi t$ for a very thin film, where λ_0 is the critical wavelength on a flat substrate. It also defines three distinct regimes of growth stability depending on the wavelength of substrate undulation (λ_s): for $\lambda_s \leq \lambda_0/2$, growth is stable; for $\lambda_s \geq \lambda_0$, growth is unstable; in between, growth is unstable below a critical film thickness t_c , and stable above it.

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