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Capillary forces induced wrinkling onto ultrathin single and bilayer polymer films[1] JOOYOUNG CHANG, JOSEPH PAULSEN, KAMIL TOGA[2], NARAYANAN MENON, THOMAS RUSSELL, Univ of Mass - Amherst — We have studied wrinkling phenomena on ultrathin polymer sheets floated onto the aqueous media. As previously studied (*Science*, 2007, 317(5838), 650–653, and *Soft Matter*, 2013, 9, 8289–8296), the capillary forces of a water droplet placed on a floating sheet generate compressive hoop stresses, causing the sheet to wrinkle. In our current work, we investigate this phenomenon over a broader range of film thicknesses (7 nm to 950 nm) of Polystyrene (PS), Poly(methyl methacrylate) (PMMA), as well as with PS/PMMA bilayers. We report that the Young's modulus of PS (Mw: 97K) inferred from the wrinkle pattern is not significantly affected even if the thickness of PS is less than 10 nm. Furthermore, we also show that the type of the polymer (i.e. PS or PMMA) of the bottom layer of the bilayer system affects the length of the wrinkles.

[1]Keck Foundation
[2]Kamil Bugra Toga is currently working at Eastman Chemical Company.

JOOYOUNG CHANG
Univ of Mass - Amherst

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