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Thermocapillary Multidewetting of Thin Films ARIELLE MARIE GAMBOA, TIANXING MA, VALERIA SARO-CORTES, MICHAEL NITZSCHE, JONATHAN SINGER, Rutgers University — Thermocapillary dewetting of liquids and molten films has recently emerged as a viable alternative to conventional microprocessing methods. As this thermal gradient-induced mechanism is universal, it can be applied to any material. This work explores the sequential dewetting of materials with varying melting points, including polymers and metals, to create aligned morphologies. The variation in melting point allows for the dewetting of single layers at a time or mobility-limited simultaneous dewetting. As a result, a variety of multimaterial structures can be produced with built-in alignment, such as arrays of concentric circles, lines with periodic segmentation, or islands on holes. This approach employs photothermal methods to induce the necessary thermal gradient, with several variables being manipulated in order to influence the consequent structures. Adjusting laser power and light intensity allows for the control of temperature for selective dewetting of films; altering beam size and exposure time affects the extent of dewetting in terms of diameter size; overlap effects and simultaneous dewetting can result in complex architectures.

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