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Swelling-Induced Hierarchical Structures WEI HAN, BO LI, ZHIQUN LIN, Georgia Institute of Technology — When the two layer structures comprised of the polyvinylpyrrolidone (PVP) thin film as substrate and the upper gradient poly (methyl methacrylate) (PMMA) stripes prepared via controlled self-assembly (CESA) were subjected to ethanol vapor, which is selective solvent for PVP, hierarchical wrinkles were observed due to the osmotically driven swelling associated with solvent-vapor sorption. Due to the confinement imposed by the PMMA stripes, the wrinkles aligned perfectly perpendicular to stripes. Quite intriguingly, three-levelhierarchical arrangement of winkles containing nanoscale micelles were also produced by CESA of PS-b-P4VP on the PVP film, followed by the exposure to the ethanol vapor. The patterns were stable in both swollen and dry states, thus creating a versatile approach that is useful for diverse polymers to produce complex patterns with long-range orders.

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