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Dynamic Self-Assembly of Polymers from a Sphere-on-Flat Geometry ZHIQUN LIN, SUCK WON HONG, JUN XU, Iowa State University — Self-assembly of micro- and nano-scale materials to form ordered structures promises new opportunities for developing miniaturized electronic, optoelectronic, and magnetic devices. In this regard, several elegant methods based upon self-assembly have emerged, for example, self-directed self-assembly and electrostatic self-assembly. Dynamic self-assembly of nonvolatile solutes via irreversible solvent evaporation has been recognized as an extremely simple route to intriguing structures. However, these dissipative structures are often randomly organized without controlled regularity. In this presentation, we will show a simple, one-step technique to produce well-ordered structures (e.g., concentric rings) consisting of polymers with unprecedented regularity by allowing a drop of polymer solution to evaporate in a sphere-on-flat geometry. This technique, which dispenses with the need for lithography and external fields, is fast, cost-effective and robust. As such, it represents a powerful strategy for creating highly structured, multifunctional materials and devices.

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