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Nonequilibrium Assembly of Polymers and Quantum Dots from a Confined Geometry ZHIQUN LIN, SUCK WON HONG, JUN XU, MYUNGHWAN BYUN, Iowa State University — Dissipative structures, such as convection patterns and fingering instabilities, are formed when a droplet containing nonvolatile solutes (e.g., polymers, nanoparticles, colloids, or DNA) is allowed to evaporate on a solid surface. However, these self-organized structures are, in general, irregular. The evaporation is, in principle, a nonequilibrium process. Herein, we report a simple, one-step technique to produce well-ordered structures consisting of polymers or quantum dots 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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