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Site-Specific Colloidal Crystal Nucleation by Template-enhanced Particle Transport CHANDAN K MISHRA, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, INDIA, A K SOOD, Indian Institute of Science, Bangalore, INDIA, RAJESH GANAPATHY, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, INDIA — The deliberate positioning of nano- and microstructures on surfaces is often a prerequisite for fabricating functional devices. While template-assisted nucleation is a promising route to self-assemble these structures, its success hinges on particles reaching target sites prior to nucleation and for nano/microscale particles, this is hampered by their small surface mobilities. We tailored surface features, which in the presence of attractive depletion interactions not only directed micrometer-sized colloids to specific sites but also subsequently guided their growth into ordered crystalline arrays of well-defined size and symmetry. By following the nucleation kinetics with single-particle resolution, we demonstrate control over nucleation density in a growth regime that has hitherto remained inaccessible. Our findings pave the way towards realizing non-trivial surface architectures composed of complex colloids/nanoparticles as well.

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