

Light-controlled self-assembly of non-photoresponsive nanoparticles

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Abstract The ability to reversibly guide the assembly of nanosized objects with external stimuli, in particular light, is of fundamental importance, and it contributes to the development of applications as diverse as nanofabrication [1] and controlled drug delivery [2]. However, all systems described to date are based on nanoparticles that are inherently photoresponsive, which makes their preparation cumbersome, and can significantly hamper their performance [3]. Here, we describe a conceptually new methodology to reversibly assemble nanoparticles using light, which does not require that the particles be functionalized with light-sensitive ligands. Our strategy is based on the use of a photoswitchable medium that responds to light in such a way that it modulates the interparticle interactions. Nanoparticle assembly proceeds quantitatively and without apparent fatigue in solution as well as in gels. Exposing the gels to light in a spatially controlled manner allowed us to draw images that spontaneously disappeared after a specific period of time.

References

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