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Shape Memory Colloidal Assemblies of Janus Ellipsoids BENJAMIN SCHULTZ, Univ of Michigan, Department of Physics, AAYUSH SHAH, Univ of Michigan, Department of Macromolecular Science and Engineering, WENJIA ZHANG, Univ of Michigan, Department of Chemical Engineering, MICHAEL SOLOMON, Univ of Michigan, Department of Chemical Engineering, Macromolecular Science and Engineering, SHARON GLOTZER, Univ of Michigan, Department of Phyics, Chemical Engineering, Macromolecular Science and Engineering — AC electric and magnetic fields have been widely used to create reconfigurable chains of uniform and patchy colloidal particles that can be used to create switchable, anisotropic electronic and elastic responses in bulk media. Here, we report a joint experimental and computational study of the self and directed assembly of patchy ellipsoidal particles that combine both shape and interaction anisotropy. These particles are synthesized by sequentially combining evaporative deposition of chrome and gold with the uniaxial deformation of polymeric colloidal particles. We explore the self assembly behavior of these particles into clusters and one dimensional chains as a function of salt concentration and aspect ratio. From computational studies, we identify the minimal interactions required to reproduce experimentally observed structures and mechanisms driving chain growth. Upon the application of an AC electric field, we exploit the asymmetric polarizability of these particles to assemble chain structures with new morphologies. We are able to reconfigure between AC field and equilibrium self assembly structures, enabling the actuation of self assembled chains for rapid switching rates and accelerating chain growth for slow switching rates.

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