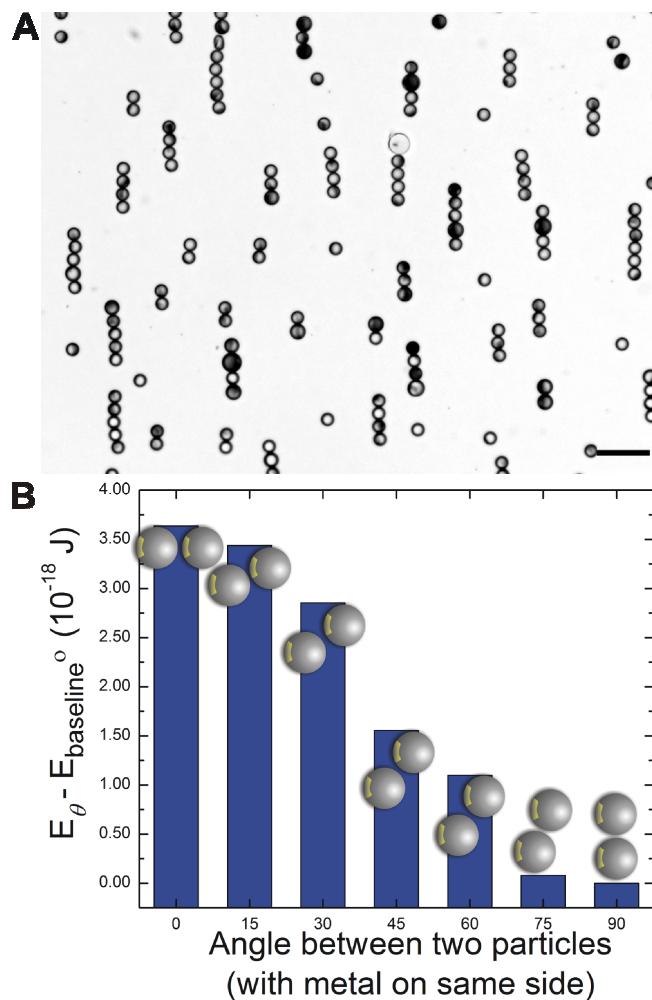


## Programmed Assembly of Metallodielectric Patchy Particles in External AC Electric Fields

Sumit Gangwal, Amar Pawar, Ilona Kretzschmar, and Orlin D. Velev\*

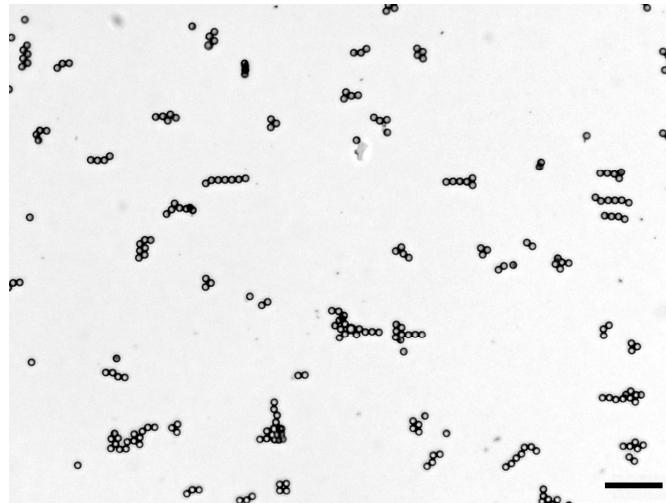
\* Electronic address: odvelev@unity.ncsu.edu

### Supplementary Figures



**Supplementary Fig. 1** Optical micrograph and simulation results of structures from 11% single-patch 5  $\mu\text{m}$  particles formed at low-frequency AC electric fields. (A) The particles form regular, straight chains in applied AC electric field of  $\sim 55 \text{ V cm}^{-1}$  at 0.5 kHz. Two-pole patchy particles also form regular, straight chains when such low-frequency AC fields are applied. (B) Effect of the angle between two 11% single-patch particles on their potential energy difference in an AC field of 1 kHz frequency. The chains parallel to the field direction are the most favorable at low-

frequency AC fields. In the optical image in (A) the electric field direction is between the top and bottom of the image and the scale bar represents 20  $\mu\text{m}$ .



**Supplementary Fig. 2** Optical micrograph of structures assembled from single-patch particles with smaller diameters. The particles of 2.4  $\mu\text{m}$  diameter have a single patch of 11% and form perpendicular chains in an AC electric field of  $\sim 190 \text{ V cm}^{-1}$  at 400 kHz. The electric field direction is between the top and bottom of the image and the scale bar represents 20  $\mu\text{m}$ .