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Guided colloidal crystallization in a galvanic micro reactor CHRISTIAN PUNCKT, LINDA JAN, Princeton University, Princeton, NJ 08544, BORIS KHUSID, New Jersey Institute of Technology, University Heights, Newark, NJ 07102, ILHAN A. AKSAY, Princeton University, Princeton, NJ 08544 — We present a novel method for assembling colloidal particles into an ordered coplanar array of two-dimensional crystals. This technique utilizes an autonomous galvanic micro reactor to control the location and morphology of colloidal crystals. Coplanar arrays of copper and gold microelectrodes are placed into a dilute water solution of hydrochloric acid to form a galvanic couple between the copper acting as an anode and the gold as a cathode. Under appropriate conditions, colloidal particles suspended in the solution assemble into two-dimensional colloidal crystals adherent to the anodic copper. Polystyrene and silica particles having similar sizes and zeta potentials but different densities were employed to study the fluid flow in the galvanic reactor. Spatially resolved, optical analysis of the reaction rate was used to estimate the magnitude and distribution of the electric current over the copper electrodes. Physical mechanisms governing the particle motion and aggregation will be discussed.

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