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Convection-driven aggregation of micron sized capsules OLEG SHKLYAEV, HENRY SHUM, ANNA BALAZS, Department of Chemical Engineering, The University of Pittsburgh — Collective dynamics of microcapsules often serve as a model for understanding behavior observed in colonies of biological cells. Using computer simulations, we explore the capability of chemically generated convection to assemble microcapsules into a colony with neighbors close enough to facilitate chemical communication. The microcapsules are assumed to carry a supply of chemical fuel. When this fuel, leaking out of the capsules, reacts at enzyme-covered sites of the chamber, the reaction generates fluid density variations driving flows. These flows carry the microcapsules, which tend to aggregate into colonies on and near the enzyme-covered sites. This aggregation continues until the reagent has been depleted and convection stops. We show that capsule colonies of predesigned shapes can be assembled by patterning the enzyme-covered surface.

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