

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Lock and Key Colloids**<sup>1</sup> STEFANO SACANNA, WILLIAM IRVINE, PAUL CHAIKIN, DAVID PINE, NYU — We demonstrate a recognition mechanism between microscopic (colloidal) particles based on a simple “lock-and-key” principle that relies only on the complementary morphology of the particles involved. The system we developed consists of charge-stabilized spherical silica colloids (keys) and specially designed polymeric particles with spherical cavities (locks). The assembly of locks with keys is driven by depletion interactions between the particles and an uncharged water soluble polymer (poly-ethylene oxide). We show that by balancing electrostatic repulsion and depletion attraction, we induce a selective and reversible lock-and-key self-assembly. Moreover, we can design the lock and key single units to have separate functionalizable chemistries, such that the resulting composite particle (lock+key) will exhibit anisotropic surface properties.

<sup>1</sup>This work was supported by The Netherlands Organisation for Scientific Research (NWO).

Stefano Sacanna  
NYU

Date submitted: 21 Nov 2008

Electronic form version 1.4