

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Pair Interaction of Catalytically Active Colloidal Particles** NIMA

SHARIFI-MOOD, University of Pennsylvania, SERGEY SHKLYAEV, Institute of Continuous Media Mechanics, UBALDO CORDOVA-FIGUEROA, University of Puerto Rico-Mayagüez — An increasing number of experiments on catalytically-driven (active) colloidal particles have shown that the interaction of chemically active particles is more complicated than usual interaction of two nonreactive (passive) particles. Indeed, each chemically active particle changes the distribution of reactants which, in turn, generates an overall force on other particles. First, we consider a pair of spherically symmetric catalytic particles, which are far from each other, in a colloidal dispersion of reactants and products. In this case there appears a force which can be either attractive or repulsive depending on the stoichiometry factor of the reaction. In fact, the interaction force can be thought of as a force between two charged particles which can bear charges of either the same or opposite signs depending on the stoichiometry factor. Next, we deal with interaction between catalytic and passive (cargo) particles. It is demonstrated that the force on a cargo is exactly the same as the force imposed by a catalytic particle on another one. On the other hand, the force on a catalytic particle imposed by the cargo is much smaller. Within the above-mentioned electrostatic analogy, the cargo particle is equivalent to a particle of vanishing permittivity.

Nima Sharifi-Mood  
University of Pennsylvania

Date submitted: 01 Aug 2014

Electronic form version 1.4