

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Modeling the motion of non-adhesive and adhesive capsules through channels with posts** GUANGDONG ZHU, ALEXANDER ALEXEEV, ANNA BALAZS, Chemical Engineering Department, University of Pittsburgh — We study numerically the motion of compliant microcapsules in microchannels. These microchannels have two adhesive posts on the walls that form an orifice with a separation distance roughly comparable in size to the diameter of the capsules. Each microcapsule consists of an elastic shell that is filled with a viscous fluid. The capsules model synthetic polymeric microcapsules or biological cells, such as leukocytes. The microcapsules are driven to move through the channels by an imposed pressure gradient. To model this multi-component system, we combine the lattice Boltzmann model for fluid dynamics and the lattice spring model for the micromechanics of elastic solids. We probe the effect of capsule stiffness and adhesion between the posts and capsule on the motion of capsules within the channel.

Guangdong Zhu  
Chemical Engineering Department, University of Pittsburgh

Date submitted: 19 Nov 2006

Electronic form version 1.4