

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Preparation of monodisperse microspheres from the Laplace pressure induced droplet formation in micromolds CHANG-HYUNG CHOI, JONGMIN KIM, SUNG-MIN KANG, Chungnam National University, JINKEE LEE, Sungkyunkwan University, CHANG-SOO LEE, Chungnam National University — Monodisperse microspheres play critical roles in many applications such as micro-electromechanical systems (MEMS), chemical release systems, optical materials and various biological applications. Although microfluidic systems have been developed for producing monodisperse microspheres, it still definitely requires pressure driven flow for continuous fluid injection as well as use of surfactant to achieve their uniformity. Here, we present a novel molding method that generates monodisperse microspheres through surface-tension-induced flow. Two immiscible fluids that consist of photocurable monomer and hydrophobic oil are sequentially applied onto the mold. The mold geometry results in Laplace pressure induced droplet formation, and these droplets formed are individually localized into each micromold. Photopolymerization of the droplets allow for the formation of polymer microspheres with narrow size distribution (CV=1.9%). We obtain the microspheres with diameter ranging from 20 to 300 μm by modulating mold dimensions. We provide a synthesis method to produce microspheres in micromolds for various reaction schemes: UV-polymerization, sol-gel reactions and colloidal assemblies.

Chang-Hyung Choi
Chungnam National University

Date submitted: 07 Nov 2012

Electronic form version 1.4