Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Imaging the liquid film layer of slug flow within a microreactor[1]
SHAHRAM POUYA, MANOOCHEHR KOOCHESFAHANI, Michigan State University, ANDREW GREYTAK, DANIEL NOCERA, MOUNGI BAWENDI, VICKI DYDEK, KLAVS JENSEN, Massachusetts Institute of Technology — Segmented gas-liquid microreactors have gained attraction for high throughput material synthesis and sample processing in chemistry and biotechnology. The performance of the segmented gas-liquid microfluidic reactor derives from the uniformity of the gas-liquid segment lengths and the mixing that occurs within the liquid segment confined between gas slugs. The mixing process is a consequence of the recirculating flow that is set up within the liquid slugs. An important aspect of this flow geometry is that the liquid segments are not completely isolated but interconnected through a thin liquid film. Therefore, the behavior of the film layer and the flow field within the slugs are of great importance in hydrodynamics of the microreactor flow and improving the efficiency of such reactors. We present preliminary results of imaging, with quantum dots, the thin film layer surrounding the gas bubbles. The results are presented for stable slug flow of Ethanol/Nitrogen within a PDMS microreactor with channel size of 300×250 micron.

[1]This work was supported by the CRC Program of the National Science Foundation, Grant Number CHE-0714028.

Shahram Pouya
Michigan State University

Date submitted: 07 Aug 2009 Electronic form version 1.4