Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Controlling Flow Speed in Microfluidic Paper-based Analytical Devices via Hollow Channels[1] HAIPENG ZHANG, University of Nebraska-Lincoln, DANIELLE BARMORE, University of Wisconsin-La Crosse, SANGJIN RYU, University of Nebraska-Lincoln — Microfluidic paper-based analytical devices (μPADs) consist of hydrophilic paper patterned with hydrophobic barriers to create paper-based flow channels. Because a liquid sample is transported through the paper channel by capillary force, resultant flow speed is usually low, which is one limitation of conventional μPADs. In contrast, adding a hollow channel layer aligned with a paper channel can significantly increase the flow speed of a testing sample in μPADs. Liquid flow through the hollow channel appears to be driven by a pressure gradient while affected by surface wettability of the surrounding channel surfaces. It is also possible to control the flow speed by modifying the design of the hollow channel. In order to find underlying fluid dynamics principle, this study investigates the relationship between the flow speed through hollow channels in the μPAD and the design of the hollow channel.

[1]This study is supported by UNL Interdisciplinary Research Grant.

Sangjin Ryu
University of Nebraska-Lincoln

Date submitted: 01 Aug 2017 Electronic form version 1.4