

Abstract Submitted
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Novel Method for Measuring Temperature of Microchannel Flows Using Polydiacetylene Sensor Droplets IMSUNG YOO, SIMONG SONG, Hanyang Univ. — Monitoring temperature in a microchannel flow is important when to use a microfluidic chip for biochemical analysis like cell culture. There are two typical methods: using thin film thermocouples (TFTCs) and Rhodamine B solutions. The former can measure temperature of a microchannel flow accurately, but requires complex fabrication processes and high costs. In addition, it disturbs microchannel flows and is contaminated readily by reaction between TFTC and flow solutions. On the other hand, Rhodamine B has the excellent sensor property that its fluorescent intensity is linear to a flow temperature. Unfortunately, however, it often adsorbs to microchannel surfaces like PDMS and has issues of bio-compatibility due to its hydrophobicity. Thus, we propose a novel method to monitor temperature of a microchannel flow using polydiacetylene (PDA) sensor droplets. PDA, a conjugated polymer, has a unique property to transform its color from visible blue to fluorescent red by thermal stress. By monitoring the fluorescence intensity of PDA droplets in a microchannel, we found a linear relationship between the flow temperature and the fluorescence intensity in a certain temperature range.

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