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Estimation of manipulation force for droplet in O/W system under photothermal interfacial control MASAHIRO MOTOSUKE, MASAKAZU MUTO, Tokyo University of Science — Droplet-based microfluidics has been keenly investigated as a discrete operation of tiny amount of reagent or individual cell inside droplets. Noncontact maniplulation of droplets in a microfluidic platform can be achieved utilizing a photothermally induced interfacial tension gradient. Although this method could provide flexible and selective toolbox for droplet control using patterned light irradiation instead of complexed channel geometry. In this study, an experimental estimation of the manipulation force for droplet under photothermal interfacial control is presented. Temperature distribution in a PDMS microfluidic device was quantified by laser-induced fluorescence based on thermal quenching of fluorecein. Under trapped condition in a steady flow, the exerted force was determined considering a balance between the drag and the interfacial force. The results indicate that the nN-order force is available in the photothermal interfacial activation and imply the applicability of this method for a versatile droplet-based microfluidic platform.

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