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Microfluidic flow characterized by light-induced local viscosity distribution MASAHIRO MOTOSUKE, SHINJI HONAMI, Tokyo University of Science — Dominance of the viscous force in fluid flow is unique and important in a microfluidic field. The generation of property distribution, especially in viscosity, can induce the spontaneous change in flow structure. In this study, the effect of local variation of viscosity based on photothermal phenomena on the flow behavior in microchannel is examined. A light absorption in liquid causes a local change of the temperature, and it induces corresponding change in the viscosity, because of the high temperature sensitivity in liquid viscosity. The flow velocity measurement of the stable liquid flow in microchannel with the photothermally-induced viscosity variation is performed by micro-PIV technique. As a result, flow structure around the hot spot is changed by the local property variation. The origin of the change in flow behavior is investigated numerically, and it is confirmed that only the viscosity has significant effect on the fluid flow in the small domain. Additionally, optimal profile of focused light irradiation to induce the significant change in flow field is obtained.

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