Abstract Submitted
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Drive an Object Using Photothermal Convection Around a Water Vapor Microbubble[1] RYUTA MATSUMURA, SOUKI IMAFUKU, KYOKO NAMURA, MOTOFUMI SUZUKI, Kyoto University, MICRO PROCESS ENGINEERING LABORATORY TEAM — By using the photothermal heating of the thin film under laser irradiation, a water vapor microbubble is formed in degassed water. The bubble involves rapid flow, which results from the Marangoni force and bubble oscillation caused by a steep temperature gradient. It is assumed that the flow direction is changed by giving an asymmetric temperature gradient. Therefore, we changed temperature distribution by laser irradiation with multiple spots. By focusing a laser spot on the thin film immersed in degassed water, a water vapor bubble with a diameter of approximately 10 μm was created. Simultaneously, a sub laser spot was focused next to the bubble to yield a temperature gradient in the direction parallel to the film surface. Consequently, the rapid flow was generated around the bubble, whose direction was dependent on the power and position of the sub. Then, we formed on a thin mica chip as a lighter substrate the bubble which can generate flow parallel to the film surface. Finally, we succeeded in moving the mica chip by using the reaction force of the photothermal convection. It is expected to be utilized as the technique for a driving force in microfluidics.

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