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Simple way of optical manipulation of particles/cells in microfluidic systems

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Optical manipulation of small objects, e.g., particle and cells, has been widely exploited as a fundamental research tool in biochemical analysis for molecules or cell screening. However, utilization of optical force relying on controlling radiation pressure to the targets basically needs fine adjustment of optics so that this technology has not been used in Point-of-Care (POC) diagnostics including advanced Lab-on-a-chip (LOAC) platform that is drastically developing fields with the aid of micro/nanofabrication. In our study, possibility of optical manipulation for particles or cells in microfluidic systems without any optical elements was investigated. Firstly, the use of scattering force was considered. This allows us to use low-energy-density light for manipulation. Then we exploited microfabricated integrated optics which gently focused irradiated light to targets in microchannel to promote mobility of the targets. Our approach can expand the use of optical force in simpler way toward highly functionalized POC diagnostics based on LOAC platform.

Biography

Masahiro Motosuke obtained his PhD in 2006 from Keio University. He joined the Department of Mechanical Engineering at Tokyo University of Science, and then was in Department of Micro/Nanotechnology at Technical University of Denmark. He is currently an Associate Professor of Tokyo University of Science from 2012. His research interest is on the development of biomedical optical sensing and control technology in advanced lab-on-a-chip platform, including external-field-induced liquid/particle/cell handling.

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