Abstract Submitted
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Scattering of infrared light by charged microparticles using dynamic properties induced by varying electric fields TATSUKI HANGAI, University of Shiga Prefecture, AKINORI IWAI, Kyoto University, MANAMI IGA, SHIGEYUKI MIYAGI, OSAMU SAKAI, University of Shiga Prefecture — Optical devices (e.g. electronic papers and optical switches) are required to have external controllability for reactions to light. When the size of scattering object can be tuned, we obtain tunable reactions to light. A microparticle is one of the tunable materials for this purpose because a group of microparticles can change scattering of light by aggregation and dispersion, which regulate the effective size of the object. We successfully charged up microparticles (1 - 5 μm) with both polarities, similar to plasma, and observed their transport by externally applied voltage, like a collective motion in plasma [1]. The intensity of the scattering IR field with wavelength 3.39 μm was enhanced by their aggregation in our experiment. A tungsten carbide probe whose tip size was smaller than the microparticles was used as an electrode. By collecting the microparticles in advance and irradiating them with the IR laser, we confirmed the relationship between the effective size of the group of microparticles on the tip of the probe and the reflected light intensity to clarify that they can be useful components for future optical devices. [1] I. Laut, C. Rth, L. Wrner, V. Nosenko, S. K. Zhdanov, J. Schablinski, D. Block, H. M. Thomas, G. E. Morfill, Phys. Rev. E 89, 023104 (2014).

Tatsuki Hangai
University of Shiga Prefecture

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