

Principal Researcher	Hiroshi Masuhara			Number of Researchers	3	
Research Institution · Department · Title	Professor, Department of Applied Physics, Osaka University			Location of Institution	Suita, Osaka	
Title of Project	Photon-force controlled molecular systems and materials					
Abstract of Research Project	<p>Photon force is exerted on nanoparticles by a focused near infrared laser beam. Polymers, dendrimers, colloids, and nanocrystals can be manipulated freely and gathered leading to a single microparticle in solution at room temperature. In the present work the photon force is regarded as a new perturbation to molecular systems such as electromagnetic field, temperature, pressure and so on, and the resultant optical, photophysical, and photochemical effects are experimentally studied and considered in terms of electronic and molecular processes.</p> <p>It is important and indispensable to clarify what molecular parameters are responsible to photon force and to prepare molecular assembly characteristic of the force. The methodologies which make it possible to transfer and fix the assembly on a substrate surface will be developed.</p> <p>To reveal the photon force effect it is also requested to investigate photophysical and photochemical phenomena which are simultaneously induced by the focused laser beam. Absorption and fluorescence spectroscopy, surface light scattering and interferometric imaging, as well as transmittance and polarization microscopy will be developed as time-resolved spectroscopy and pictures, and applied to analyse processes of multiphoton excitation with CW laser, efficient photothermal conversion, molecular reorientation, and so on.</p>					
References	S. Masuo, H. Yoshikawa, T. Asahi, H. Masuhara, T. Sato, D-L. Jiang, and T. Aida, "Repetitive contraction and swelling behavior of gel-like wire-type dendrimer assemblies in solution layer by photon pressure of a focused near-infrared laser beam", J. Phys. Chem. B, Vol.106, No.5, pp.905-909					
Term of Project	Fiscal years 2002-2006 (5 years)					
Budget Allocation	FY2002	FY2003	FY2004	FY2005	FY2006	Total
(in thousand of yen)	36,600	19,400	13,400	11,400	8,500	89,300