Photo-Switched Storage and Release of Guest Molecules by Modified MCM-41

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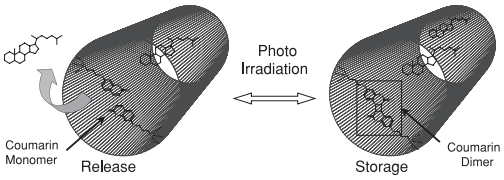
Modified MCM-41 is applicable to storage-release cycle of chemicals in the pore void. This photo-switched storage-release system is achieved by grafting coumarin derivative, which is reversibly dimerized to the corresponding dimers by ultraviolet ray irradiation, on its surface near the outlet of pore. By the formation of coumarin dimer around the pore void of MCM-41, various organic compounds are stored even after sufficient solvent washing. After photo cleavage of the coumarin-dimer, stored compounds are released to outside of the pore. This unique storage-release cycle technology provides a novel class of controlled release system and drug delivery system.



Conceptual scheme of photo-switched controlled release system

Ultrasonic Micromanipulation

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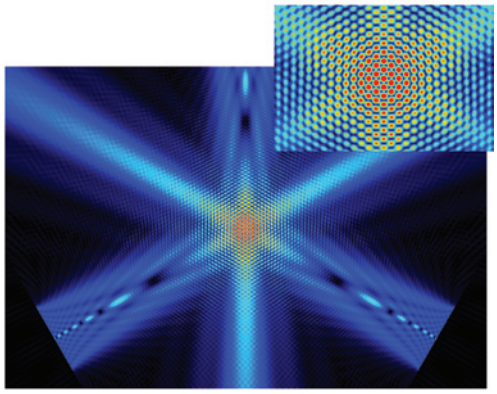
Trapping of particles and control of their positions are studied in water using acoustic radiation pressure in the ultrasonic standing wave field. The transducers are settled to make the beam axes cross with an angle of 120 degrees. When polystyrene particles are poured with a pipette into the sound field, the particles are trapped in the central region. When the phase of one of the transducers is changed, the particles move along the sound beam axis of that transducer. Two-dimensional transportation can be realized by controlling the phases of two transducers out of three. It would be possible to extend this scheme into three-dimensional manipulation by adding one more transducer.



Calculated sound pressure distribution. The right top is an enlarged picture