The 319th MANA Special Seminar

Nano Revolution for the Future

Unique Photoresponsive Materials: Photochromism and Maglev

Chair: Dr. Toyohiro Chikyow (MANA PI)

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Photochromism: We have recently developed a unique series of photochromic [2.2]PC-bridged imidazole dimers with a [2.2]paracyclophane ([2.2]PC) moiety that couples two diphenylimidazole groups. The dimers exhibit instantaneous coloration upon exposure to UV light and rapid fading in the dark. Photochromic molecules exhibiting such intense photocoloration and fast thermal bleaching performance could be promising materials for fast light modulator applications. We have succeeded to develop a fast photochromic polymer for use in a real-time dynamic holographic display that can be easily prepared by a simple casting method from a solution of the photochromic polymer. The real-time control of holographic images using a display constructed with this polymer film yielded a speed equivalent to the time resolution of the human eye. This new type of dynamic 3D display technology based on fast photochromism opens up an exciting new area of research in the future development of a large dynamic 3D display.

Maglev: Graphite has been known as a typical diamagnetic material and can be levitated in the strong magnetic field. Here we show that the magnetically levitating pyrolytic graphite can be moved in the arbitrary place by simple photoirradiation. It is notable that the optical motion control system described in this paper requires only NdFeB permanent magnets and light source. The optical movement is driven by photothermally induced changes in the magnetic susceptibility of the graphite. Moreover, we demonstrate that light energy can be converted into rotational kinetic energy by means of the photothermal property. We find that the levitating graphite disk rotates at over 200 rpm under the sunlight, making it possible to develop a new class of light energy conversion system.

Venue: **Auditorium, 1F, WPI-MANA Bldg.**

Date: **March 12th, Tuesday** ***Time:*** **15:30-16:15**

Namiki site

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