Light-driven 'molecular brakes' provide stopping power for nanomachines

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Researchers in Taiwan report development of a new type of "molecular brake" that could provide on-demand stopping power for futuristic nanomachines. The brake, thousands of times smaller than the width of a human hair, is powered by light and is the first capable of working at room temperature, the researchers say. Their study is scheduled for the June 5 issue of ACS' *Organic Letters*.

In the new study, Jye-Shane Yang and colleagues point out that the ability to control specific motions of small molecules or larger molecular structures is essential for the development of nanomachines. Some of these machines may find use in delivering drugs or performing surgery deep inside the human body.

Although scientists have already built molecular motors, wheels, and gears for powering nanomachines, the development of a practical braking system remains a challenge, the researchers say.

Yang's group assembled a prototype molecular brake that resembles a tiny four-bladed wheel and contains light-sensitive molecules. The paddle-like structure spins freely when a nanomachine is in motion.

In laboratory studies, the scientists showed that exposing the structure to light changes its shape so that "blades" stop spinning, putting on the brakes. The braking power can be turned off by altering the wavelength of light exposure, they add.

Source: American Chemical Society