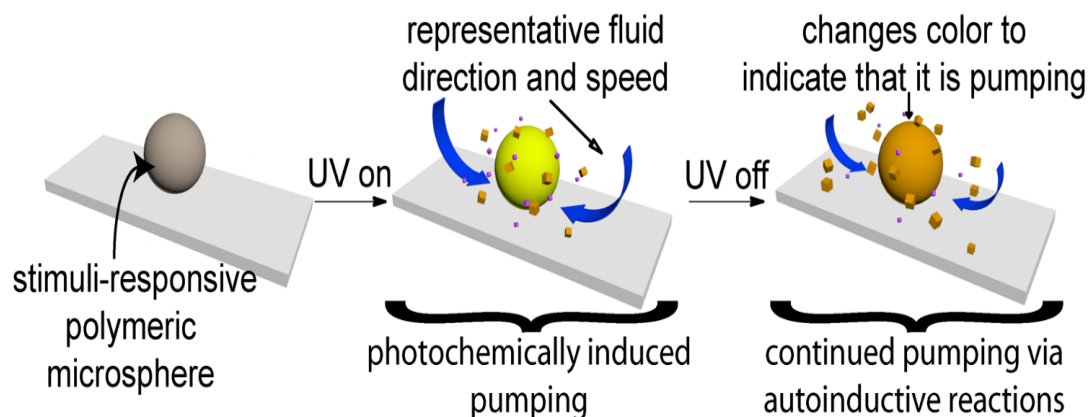




Non-Mechanical Pumps With a Memory of an Applied Signal

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Schematic of a polymer microsphere pump that induces the movement of the surrounding fluid in response to a specific stimulus, even after the stimulus has been removed.



We recently developed small molecule reagents that can be grafted onto polymer beads or surfaces to create a variety of smart pumps. The bead pumps the fluid when exposed to UV light, but it also pumps the fluid when UV light is removed—a self-propagating reaction keeps the pump operating once the stimulus is removed. In the absence of the stimulus, the pump remains off. Thus, the bead (pump) has a “memory” for the stimulus and is capable of responding even when the stimulus is fleeting. An attractive feature of this type of system is the ease with which we should be able to modify the chemistry of the reagents to enable the system to respond selectively to a variety of stimuli.