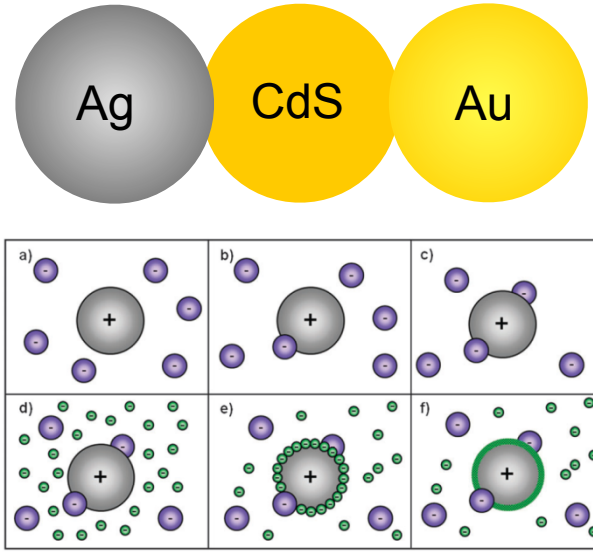
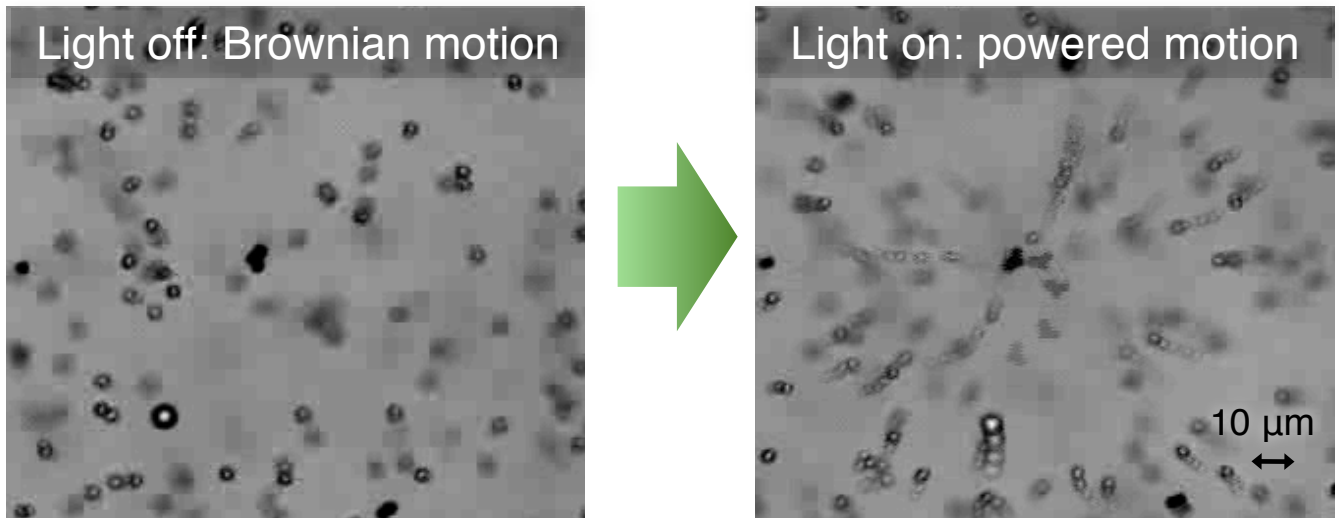
CdS motors are switchable by light

Penn State MRSEC DMR-0820404: Tso-Yi Chiang, Joe McDermott, Ayusman Sen, Darrell Velegol*



Silver-CdS-Gold trimers fabricated by quenched electrostatic assembly (shown at left) act as catalytic motors that can be switched on by light. CdS is a semiconductor with a band gap of 2.4 eV which corresponds to blue-green light. With its low native conductivity, no electrons can pass through CdS, so that the motor is not active initially. By exposing CdS to blue light, we raise the number of carriers to lower its resistivity, and thus activate the motor.



Time-lapse optical microscopy of Ag-CdS-Au in 1% H_2O_2 with overlays 0.2 s apart