

Nanoshuttles move droplets uphill

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Biasing the random motion of molecules is no easy task for chemists, even as we approach the nanotechnology era. Harnessing directional molecular motion and transforming it into measurable mechanical movement is even more of a challenge, although it is commonplace for biological molecular motors found in nature.

David Leigh and colleagues have now developed a surface that is covered with wholly synthetic molecular shuttles that shift position when exposed to light. The movement of droplets is not a direct effect of the change in position that occurs within the individual shuttle molecules. Rather, it is an ensemble effect that results from the change in surface wettability after most of the shuttle molecules change position. The phenomenon is so efficient that it generates enough energy to move a microlitre droplet up a twelve-degree slope*. This work represents a key technological breakthrough, and may prove useful in lab-on-a-chip environments, or for performing chemical reactions on a tiny scale without reaction vessels.

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