Imaging a molecular switch

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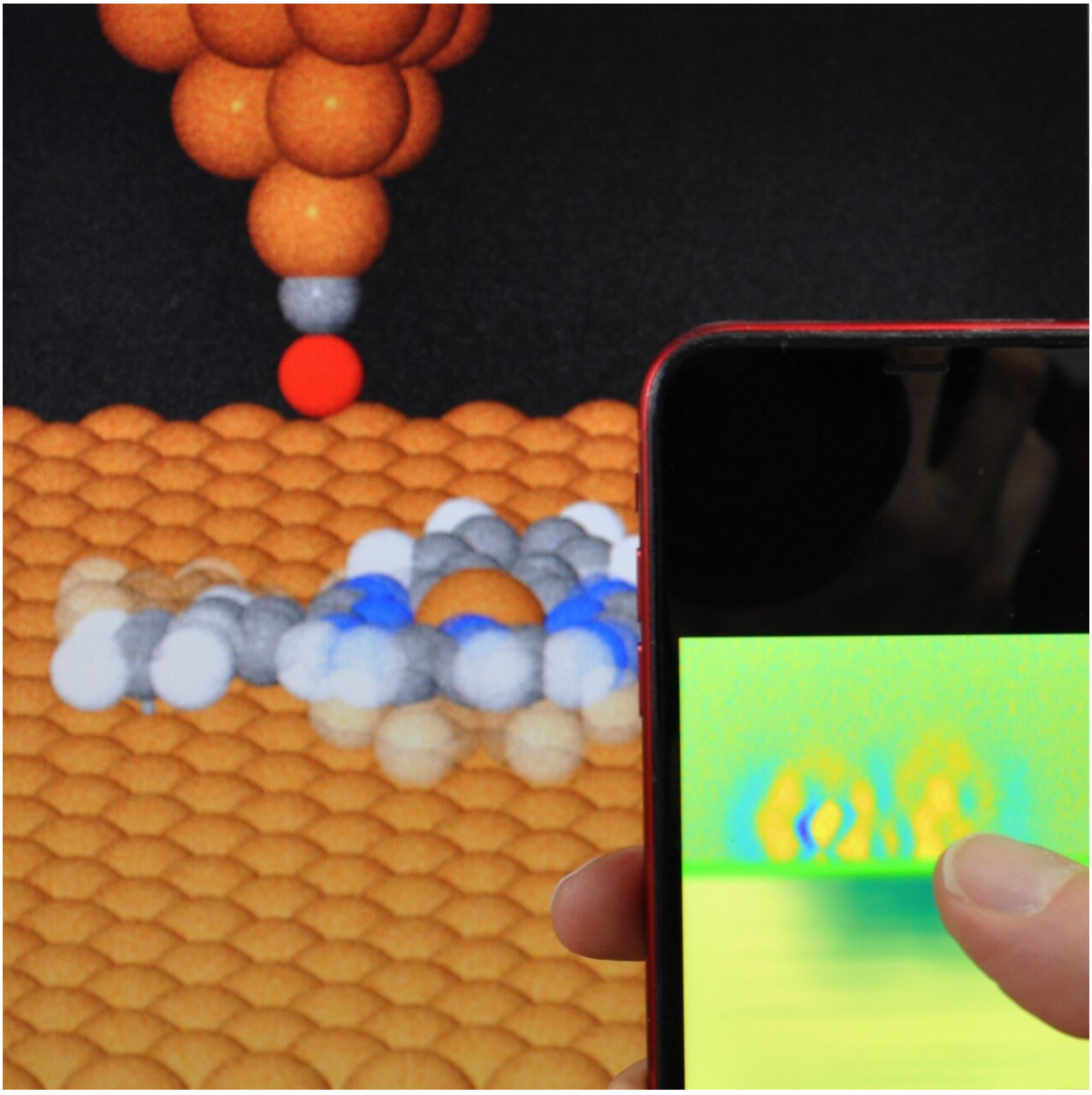

Molecular Switch. Credit: Jay Weymouth, University of Regensburg

Scanning probe microscopes like the scanning tunneling microscope and the atomic force microscope give researchers valuable information about individual molecules. One of the most interesting areas of research is molecular switches, which can be switched from one configuration to another.

The key to understanding a molecular switch is to know what is required to switch it. Normally, this is determined by a potential energy barrier. To determine the potential energy above an adsorbate with a normal AFM requires a series of images at various heights. But molecular switches can change configurations as the tip height changes, making this analysis problematic.

Researchers at the University of Regensburg used a technique called lateral force microscopy in which only a single image is required to determine the potential energy. They investigated copper phthalocyanine—a molecule used for OLEDs—on a metal surface and determined the potential energy barrier of the switching.

This is the first demonstration of lateral force microscopy capturing the "snapshot" of a molecular switch, and the team believes this technique will be applied to more systems to better understand the dynamics and stability of molecular switches.

The study is published in *ACS Nano*.

More information: Alfred John Weymouth et al. Lateral Force Microscopy Reveals the Energy Barrier of a Molecular Switch, *ACS Nano* (2021). DOI: 10.1021/acsnano.0c09965

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