

Morino Lecture

The 74th GREEN Open Seminar, The 659th MANA Seminar, The 10th CFSN Seminar

2019/9/20(Fri) : 16:00~NanoGREEN/WPI-MANA Bldg. Auditorium

: 17:15~NanoGREEN E-114

**Social gatherings: Free charge supported
by Morino Funding**

Single Molecule Switching and Sensing

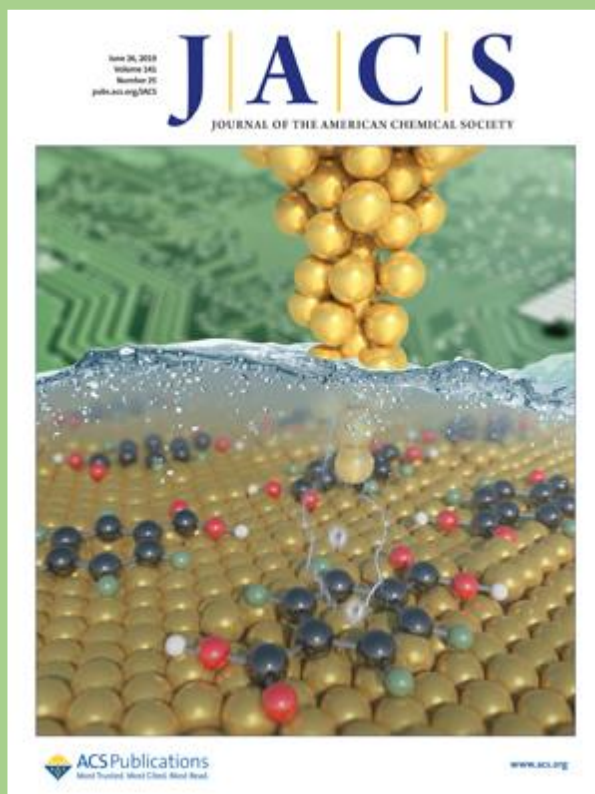


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Charge transport through and between molecules is central to important processes in nature. Studying the conductivity of single molecules can contribute to a better understanding of charge transport, and also help develop building blocks of molecular electronics, light harvesting devices, etc. We measure the conductivity of molecules using the Scanning Tunneling Microscope break-junction (STM-BJ) method that utilizes repeatedly formed circuits where one or a few molecules are trapped between two electrodes, at least one of which has nanoscale dimensions. The statistical analysis of thousands of measurements yields the conductance of single molecules.

One particular interest is the role of the molecule-electrode contact in charge transport. In the simplest analysis this contact can present a substantial barrier to charge injection, which can have important consequences in devices such as dye sensitized semiconductor nanoparticle solar cells. We have demonstrated that carbodithioate termination of molecules can enhance conductivity by an order of magnitude. We have also shown how the sensitivity of the electrical conductivity of single molecules to external perturbations can allow for switching and sensing, as well as the use of single molecule conductance for the discovery of novel materials. Our most recent developments include controlling the orientation of the molecule in the junction using the electrode potential so that we can measure conductance along different molecular axes, accessing elements of the anisotropy of the single molecule conductance tensor.



This seminar will be sponsored by Morino Foundation for Molecular Science.

Chair: Kohei Uosaki ex:4301