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Charge transport through supramolecular junctions via quadruple hydrogen bonds

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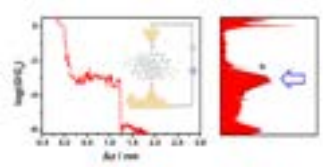
Understanding the electron transport between single molecules connected through self-assembly interaction is of great importance for molecular electronics. In this presentation, we report the electron transport investigation of an assembled supramolecular junction bridged by quadruple hydrogen bonds. A series of self-complementary ureido pyrimidine-dione (UPy) derivatives modified with different aurophilic anchoring groups were synthesized. Their electron transport properties through the quadruple hydrogen bonds in apolar solvent were probed employing the scanning tunneling microscopy break junction (STMBJ) technique. In comparison with the analogues of pyridine and amine, a molecular dimer with a thiol anchor displays the highest conductance value and largest junction formation probability, with a statistical conductance value that approaches 10-3 G0. The 1H NMR spectra and control experiments verify the formation of quadruple hydrogen bonds, which can be effectively modulated by the polarity of the solvent environment. This work suggests that a supramolecular assembly could also act as a highly conductive molecular electronics device, which offers a new design strategy and further extends the material library for future molecular electronic devices.



Biography

Wang Lin received her BE from the Department of Chemistry at Jilin University in 2011, and the PhD Degree from Institute of Chemistry, Chinese Academy of Sciences (ICCAS). She is currently an Assistant Professor in Department of Material Science and Engineering, China University of Geosciences, Beijing, China. Her research interest is in the field of molecular electronics, with specific focus on the charge transport through self-assembled single molecular devices.

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