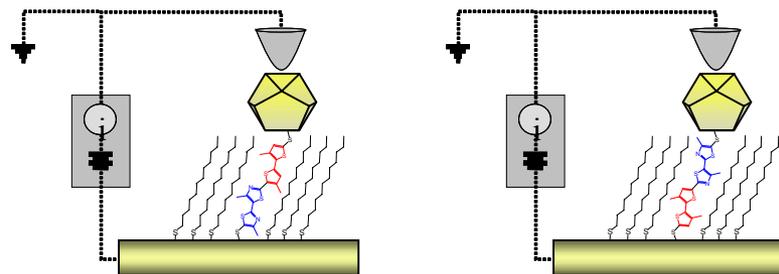


Control Electron Transport Through Sequential Assembly of Diode Molecules

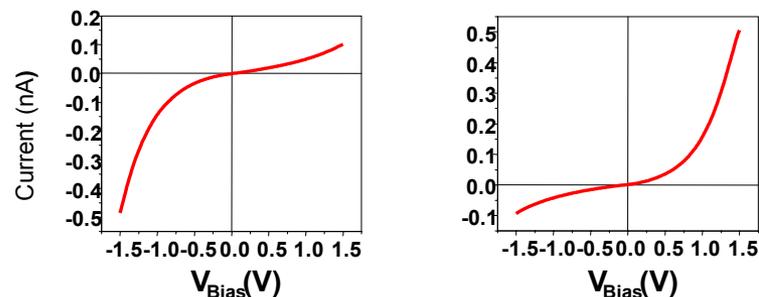
Luping Yu, University of Chicago, DMR-0139155

Molecular electronics was envisioned to be the ultimate solution for the limit in microelectronic chips. one of the most important steps towards real molecular devices is to control the functions of molecular components, such as rectification, in two-terminal molecules. we have synthesized diode molecules with two different terminal thiol groups protected asymmetrically. Sequential deprotections of these groups enables us to assemble the diode molecules with controlled orientations between two gold electrodes. By manipulating the orientations of the diblock structure between electrodes, we demonstrated the control of the rectification directions.

Angew. Chem. Int. Ed., in press (2004)



STS measurement setup for the assembly of diode molecules



Opposite rectification direction was obtained when the orientation of diode molecule changed

Control Electron Transport Through Sequential Assembly of Diode Molecules

Luping Yu, University of Chicago, DMR-

Education:

Under this grant, four students have completed their Ph.D. degrees: Man Kit Ng (Assistant Prof. at Univ. of Rochester), Qing Wang (Assistant Prof. at Penn. State Univ.), Eugene Chan (postdoc at MIT), Hengbin Wang (postdoc at UCLA); two post-doctoral scientists have been trained: Dr. Ping Jiang and Dr. Gustavo M. Morales; Currently one Ph.D graduate student Wei You (5th year) and an Undergraduate student Steve Heller are involved in this project.

Outreach:

This project have attracted attentions from industry. Intel expressed interest in our work and invited the PI to give a seminar. The PI gave a lecture in University Basel on US/Swiss Bilateral Forum on Nanoscience and Technology. The PI was invited to give a lecture in Kodak company in their Weissberger-Williams Lecture Series. The PI was invited to give a talk in workshop on the topic "Towards Molecular Electronics" to be held at the University of Ulm, Germany.