

Unimolecular Electronics

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This laboratory has studied eleven different molecules which rectify electrical current, as 2 to 3 nm thick single Langmuir-Blodgett monolayers between either Al or Au electrodes [1],[2]. The asymmetrical current-voltage (I-V) curves show a definite turn-on at forward bias, at room temperature or even at 4.2 K [1]. IETS proved that the enhanced current does travel through the molecule. If the monolayer is rigidly packed, the asymmetrical I-V curves persist under repeated cycling [1]. We are combining Langmuir-Blodgett and covalent attachment techniques to improve device reliability. Also planned is a single-molecule power amplifier (in collaboration with the Technical Universities of Delft and Dresden).

[1] R. M. Metzger, *J. Mater. Chem.* 18: 4364 (2008).

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