# Driving current through single organic molecules

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We have performed conductance measurements with a self-assembled metal-molecule-metal junction [1]. The gap between the electrodes could be adapted in situ to the molecule's length employing the mechanically controlled break junction technique. The organic sample molecules were designed to form a stable chemical bridge between the electrodes. Two molecules, which differed essentially by their spatial symmetry, showed discrete stable conductance patterns. While the asymmetric molecule always generated asymmetric current-voltage relations (IVs), the symmetric molecules often showed symmetric IVs. This allows clearly to identify the IVs as transport through our sample molecules. The body of our data strongly suggests that each stable junction is related to current through only one single molecule, connected to both metal electrodes. Considerable differences between subsequently manipulated junctions, i.e. sample-to-sample fluctuations are attributed mainly to varying microscopic contact realisations. This is clearly demonstrated by intentionally inducing different asymmetric IVs with the symmetric molecule upon tuning the electrode distance. The observed phenomena are compared with theoretical investigations [2].
A further molecule, designed to have an additional strong tunnel barrier in the middle, indeed has much higher resistance values. The IV can be well described by formula for insulating materials up to voltages as high as 6 V. This indicates the potential of a *trans*-Pt complex as insulating linker between delocalized $\pi$-electron systems on a single molecule level [3].

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