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**Conductance measurement of a single molecular chain as a continuous function of its length** LEIF LAFFERENTZ, Free University Berlin, Germany, FRANCISCO AMPLE, CHRISTIAN JOACHIM, CEMES-CNRS Toulouse, France, HAO YU, STEFAN HECHT, Humboldt University Berlin, Germany, LEONHARD GRILL, Free University and Fritz-Haber-Institut Berlin, Germany
— One prerequisite for the realization of molecular electronics is a fundamental understanding of charge transport through single molecules. We have conducted experiments with a low temperature scanning tunneling microscope (STM) that allow to measure currents going through a single long molecular wire as a continuous function of the distance between the two contacts on one and the same molecule (Science 323, 1193 (2009)). Conjugated polyfluorene chains, grown on a Au(111) surface, exhibit two important properties for a conductance measurement as they are *flexible* (they can change their curvature) and *mobile* on the surface. We show that it is possible to contact one end of a molecular chain with the STM tip and pull it gradually off the surface, up to more than 20 nm. Since the rest of the molecule remains attached to the sample, this results in a metal-molecule-metal junction with a distance between the two electrodes that can be adjusted. The resulting conductance curves reveal not only insight into the charge transport through the junction, but also information on the mechanical properties of the polymer as one molecular unit after another is detached from the surface.

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