Abstract Submitted
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Reversible, mechanically-activated switching in pyridine single molecule junctions[1] MARIA KAMENETSKA, Columbia University (CU), SU YING QUEK, Lawrence Berkeley National Lab (LBNL), MICHAEL L. STEIGERWALD, CU, HYOUNG JOON CHOI, Yonsei University, STEVEN G. LOUIE, LBNL, MARK S. HYBERTSEN, Brookhaven National Lab, J.B. NEATON, LBNL, LATHA VENKATARAMAN, CU — We measured the conductance of single pyridine-terminated molecules by mechanically forming and breaking Au point contacts with a modified STM in a solution of molecules. Conductance traces recorded while stretching the junction reveal two distinct steps at different conductance, both due to the formation of a single molecule junction between gold electrodes. To better understand the origin of this bi-stable conductance signature, we devise a new method to experimentally determine the distance between the gold electrodes for any given molecular conductance. We find a clear correlation between the level of conductance and the distance between gold electrodes, with the lower conductance corresponding to a molecule fully stretched between the contacts and the higher conductance to a molecule bound at an angle. The dependence of conductance on metal-molecule contact geometry allows us to reversibly switch between conductance states by elongating and compressing the junction.

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