

Abstract Submitted
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Electronic transport properties of functional single molecule junctions E.S. TAM, H.D. ABRUNA, D.C. RALPH, Cornell University — We report experimental studies of single molecule conductance using two techniques: statistical measurements with repeatedly-formed breakjunctions in ambient conditions and low-temperature measurements with electromigrated breakjunctions. In each case, we chose molecules with specific functions. With statistical measurements, we measured the nonconducting open and conducting closed forms of dithienylethene, a photochromic (optically switchable) molecule. These molecules were synthesized with pyridine endgroups to achieve relatively well-defined and stable contacts to Au electrodes. For the closed isomer, we find a conductance of $(3.3 \pm 0.5) G_0$, while that of the open isomer is below the noise floor of our measurement. We can therefore set a lower limit of 30 for the on/off ratio of this molecule. We are currently investigating the use of electromigrated graphene nano-constrictions and breakjunctions for spin-polarized single molecule conductance measurements and plan to present initial results for this technique.

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