Abstract Submitted
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Prevalence of Coulomb blockade in conjugated and non-conjugated molecules on gold versus palladium electro-migrated junctions[1] ARTUR ERBE, LARUE DUNKLEBERGER, KIRK BALDWIN, ROBERT WILLETT, Bell Laboratories, Lucent Technologies, ANAT DE PICCIOTTO, JENNIFER KLARE, KENJI SUGO, COLIN NUCKOLLS, Department of Chemistry and The Nanoscience Center, Columbia University — The conduction properties of electro-migration gap junctions made with Au or Pd and with various organic molecules incorporated in the gaps are studied to expose the full range of possible transport processes, and their prevalence. Primarily comparisons are made between molecules with an electron delocalized vs. electron-localized backbone, between molecules with one vs. two thiol end groups, and between molecules with and without large side chains on the Au junctions. Within these junctions Coulomb blockade can be observed in all molecular species tested, including bare junctions and those coated by molecules with no electron-accepting properties, but at significantly lower prevalence than molecules with delocalized electron backbones. Importantly, Coulomb blockade with high charging energy values is seen almost exclusively on junctions with molecules possessing the delocalized electrons. An overall lower prevalence of Coulomb blockade is observed in the Pd junctions, but with the same relative molecular dependence. These results indicate the scope of variation in transport possible for molecules on electro-migrated junctions of various metals.

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Robert Willett
Bell laboratories, Lucent Technologies

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