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**Prevalence of Coulomb blockade in electro-migrated junctions with conjugated and non-conjugated molecules** ANAT DE PICCIOTTO, JENNIFER KLARE, KENJI SUGO, COLIN NUCKOLLS, Dept. of Chemistry and The Nanoscience Center, Columbia University, ARTUR ERBE, KIRK BALDWIN, ROBERT WILLETT, Bell Labs, Lucent Technologies — The conduction properties of electro-migration gap junctions with various organic molecules incorporated in the gaps are studied in order to expose the full range of possible transport processes, their prevalence, and the model morphologies: metal to molecule to metal, metal to spurious gold clusters to metal, and their permutations. 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. 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. These results indicate the scope of variation in transport possible for molecules on electro-migrated junctions. This work is supported by the Nanoscale Science and Engineering Initiative of the National Science Foundation under NSF Award Number CHE-0117752.

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