Abstract Submitted
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Determining the conductance of single molecular wire[1] ALEXANDRE NDOBE, University of Utah, VLADIMIR BURTMAN, University of Utah, VALY VARDENY, University of Utah — We have designed a method for determining the conductance of an isolated molecular wire from the I-V characteristic of molecular junctions. The molecular diodes were 1 mm^2 in area and consist of self-assembled monolayer (SAM) from a mixture of the molecular wires and non-conducting molecules that are used as spacers; coupled to two opposite gold electrodes. We studied the I-V characteristic dependence of the fabricated diodes on the ratio, r of wires/spacers. To obtain the number of molecular wires in the device we used multiple self-assemblies and titration techniques, as well as AFM of a small portion of the SAM surface. Our method was applied to a mixture of Me-BDT (methyl-bezenedithiol) molecules as wires and PT (pentathiol) molecules as spacers. For $10^{-8} < r < 10^{-3}$ we found that the device conductance is dominated by the molecular wires. From the current and obtained number of Me-BDT molecules in the device we determined the molecular conductance of Me-BDT to be 600 MΩ, in good agreement with a theoretical tunneling model.

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