

**ELECTRON TRANSPORT IN CONJUGATED ORGANIC MOLECULES:
CAROTENE DITHIOLS**

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We present electrical characterization studies of metal-molecule-metal junctions studied with a conducting probe atomic probe microscope. In carotene thiols, the current-voltage curves are relatively insensitive to the contact probe force and cluster around integer multiples of a fundamental curve, suggesting that members of the smallest set correspond to data obtained from a single molecule. First principles calculations based on tunnel transport describe current-voltage characteristics in remarkable agreement with experimental (within a factor of 4). It appears that electron tunneling dominates transport even in this 3 nm long molecule. Carotenes are much better conductors than saturated alkanes of similar lengths. A comparison of the “resistance” of carotene with several oligo phenylene ethynylenes (OPEs) shows that electron decay length through the carotene is substantially lower.