Passing Current through Touching Molecules

The charge flow from a single C-60 molecule to another one has been probed. The conformation and electronic states of both molecules on the contacting electrodes have been characterized using a cryogenic scanning tunneling microscope. While the contact conductance of a single molecule between two Cu electrodes can vary up to a factor of 3 depending on electrode geometry, the conductance of the C-60-C-60 contact is consistently lower by 2 orders of magnitude. First-principles transport calculations reproduce the experimental results, allow a determination of the actual C-60-C-60 distances, and identify the essential role of the intermolecular link in bi- and trimolecular chains.
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