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Charge Storage Based Hysteretic Negative-Differential-Resistance in Metal-Molecule-Metal Junctions RICHARD KIEHL, University of Minnesota, JOHN LE, University ofo Minnesota, PANGLIJEN CANDRA, University ofo Minnesota, REBECCA HOYE, University ofo Minnesota, THOMAS HOYE, University ofo Minnesota — Experimental results on the electrical characteristics of Hg-alkanethiol//arenethiol-Au molecular junctions are used to develop a physical model for the hysteretic negative differential resistance observed for these, and possibly other, metal-molecule-metal junctions. The dependence of the current-voltage characteristic on sweep direction and rate are examined together with the voltage dependence of the junction's ac conductance. Based on several specific electronic properties, it is concluded that the observed behavior is caused by a slow charge storage process. The implications of this model on potential electronic applications are discussed.

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