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Vibrational Excitations in Single-Trimetal-Molecule Transistors DONG-HUN CHAE, ZHEN YAO, Department of Physics, The University of Texas at Austin, Austin, TX 78712, JOHN F. BERRY, CARLOS A. MURILLO, F. ALBERT COTTON, Department of Chemistry, Texas A&M University, College Station, TX 77843 — Transistors have been fabricated by incorporating single molecules of $Cu_3(dpa)_4Cl_2$ and $Ni_3(dpa)_4Cl_2$ (dpa = 2,2'-dipyridylamide) in a nanometer-sized gap between a pair of gold electrodes created by the electromigration technique on an oxidized aluminum electrode which serves as a gate. Conductance is measured as a function of the bias and gate voltages at 4.2 K, showing single-electron tunneling behavior through the inserted complexes. Additional structures corresponding to the excitations in the molecules have been observed, which are attributed to the intramolecular vibrational excitations of the molecules coupled to the single-electron tunneling processes. The energies of the vibrational states are dependent on the redox states of the included molecules.

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