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Chemical Structure and Molecular Switches. AMY BLUM, Naval Research Laboratory, DAVID LONG, SAIC, MARTIN MOORE, Naval Reseach Laboratory, JAMES KUSHMERICK, NIST, JAMES TOUR, Rice University, BANAHALLI RATNA, Naval Research Laboratory — The future of molecular electronics depends on designing molecules to exhibit specific nonlinear properties such as rectification or bistable switching. In pursuit of this goal, two distinct types of switching were observed in matrix isolated and complete monolayers of bipyridyl-dinitro-oligophenylene-ethynylene (BPDN). Several groups have observed conductance state switching in this molecule. However, the mechanism of switching between the two conductance states is still not understood. Using BPDN as a starting point, chemically related structures such as bipyridyl- oligophenylene-ethynylene, dinitro-oligophenylene-ethynylene, and biphenyl- oligophenylene-ethynylene were measured in matrix isolated monolayers. By means of such comparisons to related molecules, we determine the key functional groups leading to switching in BPDN.

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