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(71) Applicant: THE MITRE CORPORATION [US/US]; 7515 Colshire Drive, McLean, VA 22102 (US).

(72) Inventor: ELLENBOGEN, James, C.; 1422 Andmar Drive, McLean, VA 22101 (US).

(74) Agents: ROSENBERG, Morton, J. et al.; Rosenberg, Klein & Lee, 3458 Ellicott Center Drive, Suite 101, Ellicott City, MD 21043 (US).

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(54) Title: MONOMOLECULAR ELECTRONIC DEVICE

(57) Abstract: A monomolecular electronic device is provided that includes a molecular diode having at least one barrier insulating group chemically bonded between a pair of molecular ring structures to form a pair of diode sections, at least one dopant group chemically bonded to one of the pair of diode sections, and a molecular gate structure chemically bonded to the one diode section for influencing an intrinsic bias formed by the at least one dopant group. The device thus produced operates as a molecular electronic transistor, exhibiting both switching and power gain. By adding yet another insulating group to the other of the diode sections, an electrical resistance is formed to define an output which represents an inverter or NOT gate function. The NOT gate can be chemically bonded to molecular diode-diode logic structures to form a single molecule that exhibits complex Boolean functions and power gain.