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A nanodot lattice with molecular interconnects providing reconfigurable logic CARL ONNHEIM, JONAS SKOLDBERG, GORAN WENDIN, Chalmers Univ of Technology, Gothenburg, Sweden — Using circuit models we investigate a FCC lattice of nanodots, interconnected by molecules with voltage-switchable linear as well as non-linear conductances, deposited on a lithographically defined set of contacts. By applying voltages to these contacts the switchable molecules open conductive paths. We open these according to a target circuit scheme that is able to implement a large set of logic gates, including half-adders. The target circuit in the nanodot lattice consists of an analogue summation node connected to a bistable latch via an NDR connection. The summation node weighs the input, driving and ground voltages. The NDR connection and the bistable latch together converts the analogue voltages to a logical one if in a mid-region and zero if low or high.We have also designed a lithographic context including clocks and transistors such that we can interconnect logic gates to e.g. implement the N-bit adder described by Tour et al. (1). C Husband, S Husband, et al. (2003). "Logic and memory with nanocell circuits." IEEE Transactions on Electron Devices 50(9): 1865-1875.

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