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Optical and Transport studies of isolated and aggregated molecular wires[1] ALEXANDRE NDOBE, VLADIMIR BURTMAN, GOLDA HUKIC, VALY VARDENY, University of Utah Physics department — We have studied the optical and transport properties of self assembled monolayer of a mixture of conducting molecules methyl-bezenedithiol (Me-BDT-wire) and non conducting molecules Pentathiol (PT-spacer). The I-V characteristic dependence of the fabricated diodes on the ratio, r of wire/spacers reveals that at low ratio 10-8 $<$ r $<$ 10-3, the transport studies of this mixture can provide us with single molecule resistance of Me-BDT; With the knowledge of the number of conducting molecules which we estimated by multiple self assembly and titration, we found that the single molecule resistance of Me-BDT is 600 MΩ. At high ratio r $>$ 10-4, we found that the conducting molecule tend to aggregate and form a broad resonant state at mid gap that is detectable through the differential conductance measurements as well as by optical absorption and photoluminescence emission.

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