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Gate effects on electronic transport in alkanedithiol single molecular junctions. HYUNWOOK SONG, TAKHEE LEE, Department of Materials Science and Engineering, Gwangju Institute of Science and Technology, YOUNGSANG KIM, HEEJUN JEONG, Department of Applied Physics, Hanyang University — We investigate the gate effects on the electronic transport properties in alkanedithiol single molecular junctions. Using electromigration-induced break junction technique, we fabricated an array type of electrode pairs with nanometer-sized separation on top of naturally oxidized aluminum gate electrodes. The alkanedithiol molecules were bridged between the nanometer-sized gap that was achieved by breaking gold nanowires fabricated using electron-beam lithography with a controlled passage of current. The electric potential applied to the aluminum gate electrode shifts the molecular energy levels relative to the Fermi energy in the metallic contacts. We will discuss the gate-bias dependent current-voltage characteristics and other observed transport properties of alkanedithiol single molecular junctions in the off-resonant tunneling transport regime.

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