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Electrode fabrication and attachment of organometallic molecules for conductivity measurements[1] S. RAJAGOPAL, Physics Department, Miami University, Oxford, OH, N. SMITH[2], Physics Department, Miami University, Oxford, OH, J.M. YARRISON-RICE, Physics Department, Miami University, Oxford, OH, C. URIG, T. SCOTT, S. ZOU, H. ZHOU, Department of Chemistry and Biochemistry, Miami University, Oxford, OH — The primary goal of this research is to understand the bonding and electronic structure within this class of compounds and the influence of a gated electric field on their conductivity. We report an approach for connecting a single molecule containing di-metal units to electrodes with nanometer gaps. We have succesfully fabricated pairs of terminal electrodes with intial gaps of ∼75 nm which we then close using electrodepostion and re-open with electromigration to nanometer gaps. The results of the time resolved voltage curve during the electrodepostion process show that most of electrodes have a very short closing time. We have also fabricated lateral three terminal devices for studying the influence of a gated third electrode. The present results show that a gap to gate distance of less than 50nm is acheivable. Our next step is to deposit molecules on the thin gap, and to measure the electrical conductivity when a single molecule bridges the gap and conducts current.

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