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Experimental studies of the relationship between DNA structure and chemical modification, and its charge transport properties V. SOGHOMONIAN, D. E. DAVIS, A. A. BELAK, J. F. DOWD, J. J. HEREMANS, Virginia Tech, Physics Department — We experimentally investigate the influence of the physico-chemical properties of DNA molecules on its charge transport capabilities. By performing comparative rather than absolute charge transport measurements, we probe the effect of chemical modifications on the electronic properties of the molecule. Modifications include the introduction of phosphodiester bond breaks, and intercalation of metal cations, as probes to ascertain the relationship between DNA structure and electronic properties. Furthermore, we perform comparative measurements between double strand and single strand DNA molecules, to probe the importance of DNA duplex structure on its electronic properties. Our comparative current-voltage measurements yield distinct curves associated with specific modifications to the DNA molecule. We also investigate different lengths of lambda DNA. AFM images confirm the presence of DNA molecules between the lithographic measurement electrodes. (NSF DMR 0103034).

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