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Electrolyte gating with ionic liquids – structural and electronic characterization of the interface TREVOR PETACH, Department of Physics, Stanford University, APURVA MEHTA, SLAC National Accelerator Laboratory, DAVID GOLDHABER-GORDON, Department of Physics, Stanford University —
Oxide dielectrics used for traditional gating suffer from breakdown, which limits the electric field that can be applied and thus the carrier density. Because of their wide electrochemical window, ionic liquids have recently been used to replace oxide dielectrics in hope of achieving higher carrier densities. We show that the specific capacitance of the interfacial layer for several common ionic liquids is 5 - 10 μF/cm^2, that the breakdown voltage is 3 - 6 volts, and that the characteristic time for the double layer to form is several milliseconds. We also show that the DC behavior of the ionic liquid interface at large potentials is not purely electrostatic.

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