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The effect of SiO_2 surface states on the electronic characteristics of graphene FET devices JORGE SOFO, NING SHEN, HUGO ROMERO, PETER EKLUND, Dept. of Physics, Penn State — Electronic states localized at the surface of oxide semiconductors are a common cause of their low ionization potential. We study the properties of the SiO_2 surface states using density functional theory (DFT) and show that they strongly affect the intrinsic doping of graphene on oxidized silicon substrates. We present simple empirical model that it is parameterized from the DFT calculations. The model demonstrates that Dirac voltages as large as 50 V and intrinsic n-doping are produced by the presence of these surface states. We extend it to include the effect of other adsorbates, such as water, that modify the dielectric properties of the device.

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