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Stable Chemical Doping of Graphene for Low Electrical Resistance and High Optical Transparency KARA BERKE[1], SEFAATTIN TONGAY[2], MAX LEMAITRE[3], ZAHRA NASROLLAHI[4], DAVID TANNER[5], BILL APPLETON[6], ARTHUR HEBARD[7], University of Florida — Since becoming experimentally available, graphene has been used in various devices such as field effect transistors (FETs), solar cells and sensing applications. Although graphene based devices with modest characteristics have been reported, in some device geometries a lower graphene resistance with different Fermi level values is still desired. Here, we describe our use of a hydrophobic organic dopant with strong electronegativity, environmental stability and high optical transmittance which is spin cast onto CVD-grown graphene films. We observe a typical 70% reduction in resistance upon chemical modification of the graphene. Magnetoresistance measurements imply that the modified graphene is hole doped, and time-dependent resistance measurements show excellent stability. Using Raman spectroscopy we confirm the doping of graphene sheets from the shifts in G and 2D peak positions and intensity ratios. We show transmittance and SEM characteristics of the graphene sheets before and after doping. These results may serve as a guide for modification of graphene's properties as desired for various applications.

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