

Emission Ellipsometry Study in Polymeric Interfaces Based on Poly(3-Hexylthiophene), [6,6]-Phenyl-C₆₁-Butyric Acid Methyl Ester and Reduced Graphene Oxide

Ana Clarissa H. Kolbow¹, Everton Crestani Rambo¹, Maria Ruth Neponucena dos Santos¹, Paulo Ernesto Marchezi², Ana Flávia Nogueira³, Alexandre Marletta⁴, Romildo Jerônimo Ramos¹, Eralci Moreira Therézio^{1,*}

¹ Institute of Physics, Federal University of Mato Grosso, Cuiabá, MT, Brazil; ana.kolbow@fisica.ufmt.br (A.C.H.K.); everton@fisica.ufmt.br (E.C.R.); mariaruth_neponucena@hotmail.com (M.R.N.S.); romildo@fisica.ufmt.br (R.J.R.); therezio@fisica.ufmt.br (E.M.T.)

² Department of NanoEngineering, University of California San Diego, 9500 Gilman Drive, La Jolla, California 92093, United States; pauloernestom@gmail.com (P.E.M.)

³ Chemistry Institute, University of Campinas, Campinas, SP, Brazil; anafla@unicamp.br (A.F.N.)

⁴ Institute of Physics, Federal University of Uberlândia, Uberlândia, MG, Brazil; marletta@ufu.br (A.M.)

* Correspondence: therezio@fisica.ufmt.br

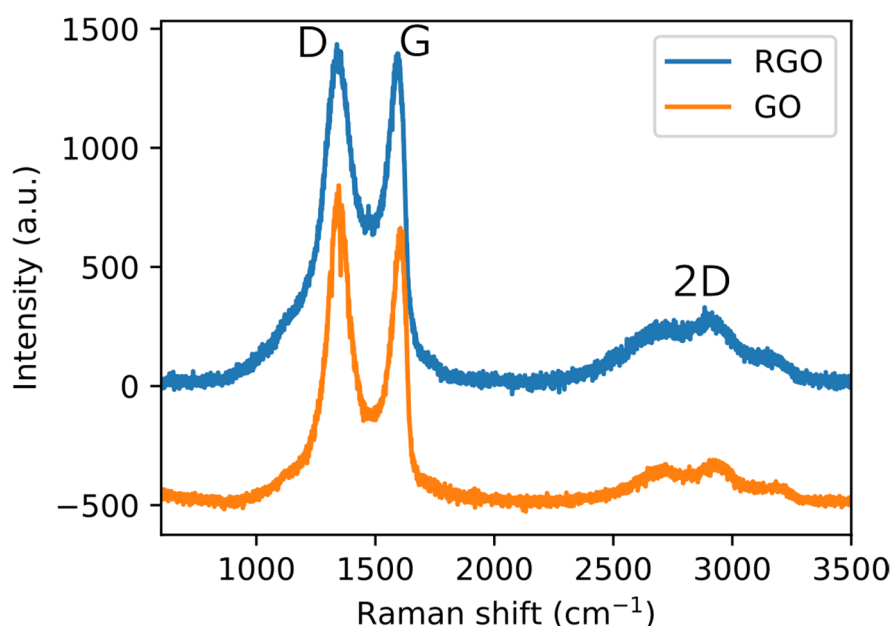


Figure S1. Raman spectra of GO and RGO.

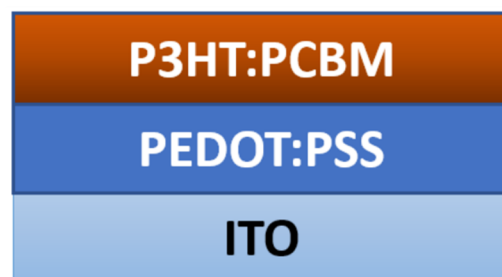
Figure S1 compares the Raman spectra of GO and rGO. The G bands, which arose from the stretching of sp² carbon, graphitic hexagon-pinch mode, located at around 1580 cm⁻¹, while the D band appears due to the presence of disorder and defects in the atomic arrangement located at 1340 cm⁻¹. Thus, the ratio between the intensity of the D and G bands (I_D/I_G) can tell us information about the restoration of the sp² framework, which is desirable in the reduction of GO to RGO. Our results show that the I_D/I_G decreases from 1.18 to 1.03 for RGO and RGO, respectively. This shows us that the GO was reduced and our RGO has a higher amount of sp² carbons.



(a)



(b)



(c)

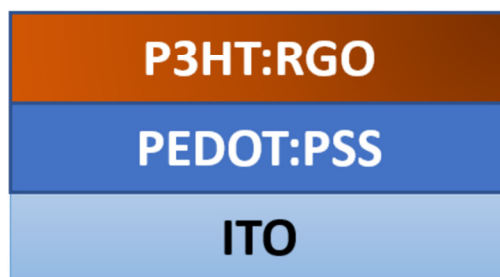


Figure S2. Scheme showing the architecture of the samples: (a) PEDOT:PSS/P3HT:PCBM:RGO, (b) PEDOT:PSS/P3HT:PCBM and, (c) PEDOT:PSS/P3HT:RGO.

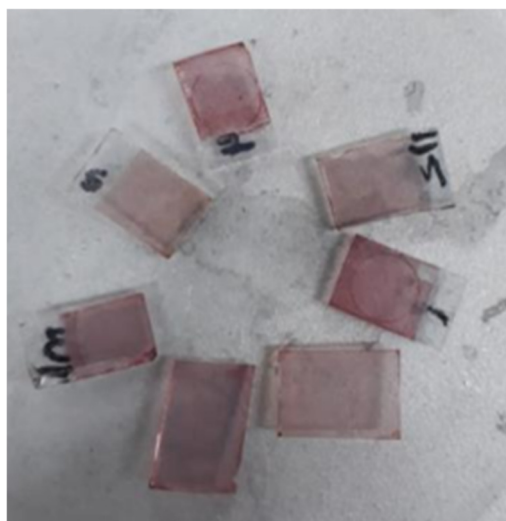


Figure S3. Images of Samples.

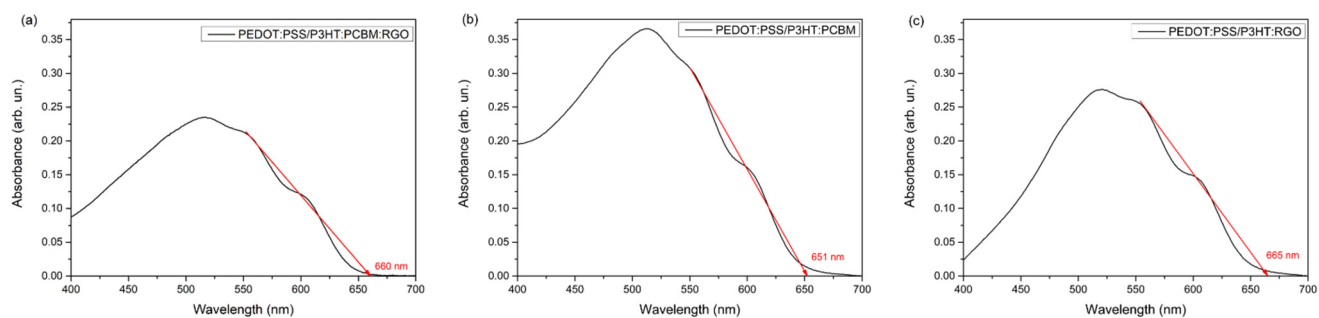


Figure S4. Absorption spectra for samples (a) PEDOT:PSS/P3HT:PCBM:RGO, (b) PEDOT:PSS/P3HT:PCBM (c) PEDOT:PSS/P3HT:RGO. Indicating cutting length.

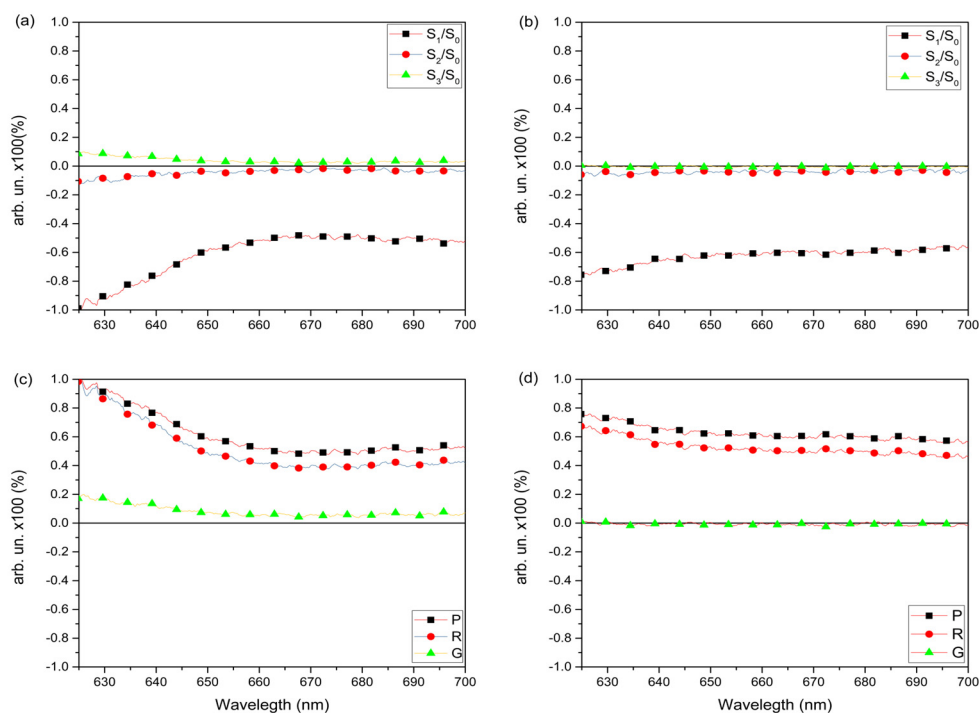


Figure S5. (a) EE spectra for sample PEDOT:PSS/P3HT:PCBM at 90 K and (b) at 300 K; (c) Polarization degree, P , anisotropy factors, r , and asymmetry, g , obtained from the Stokes parameters for sample PEDOT:PSS/P3HT:PCBM at 90 K and (d) at 300 K.

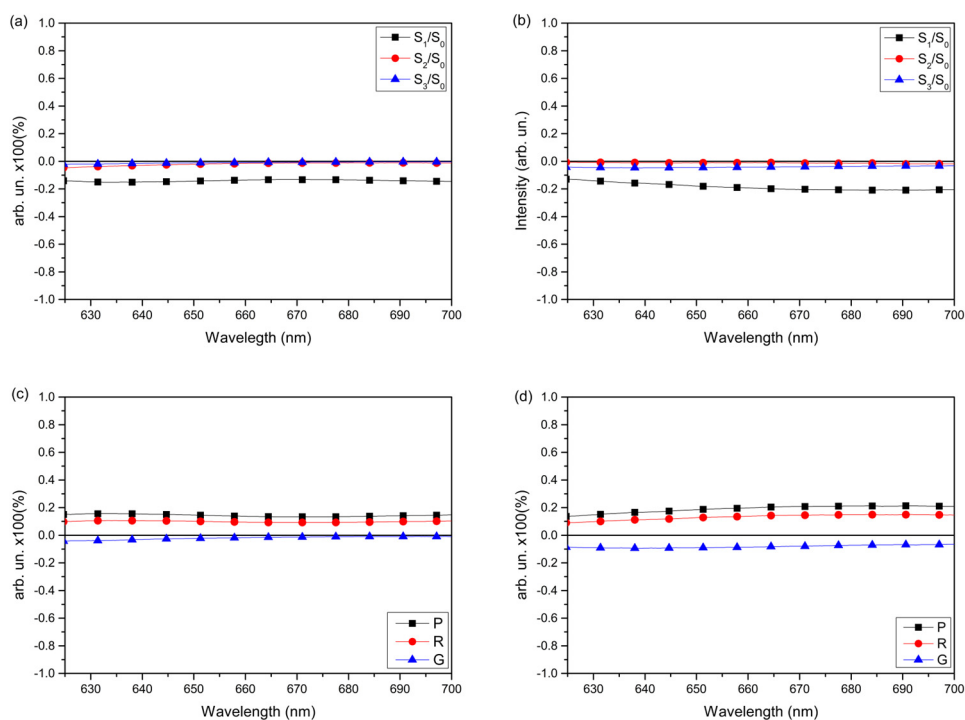


Figure S6. (a) EE spectra for sample PEDOT:PSS/P3HT:RGO at 90 K and (b) at 300 K; (c) Polarization degree, P , anisotropy factors, r , and asymmetry, g , obtained from the Stokes parameters for sample PEDOT:PSS/P3HT:RGO at 90 K and (d) at 300 K.

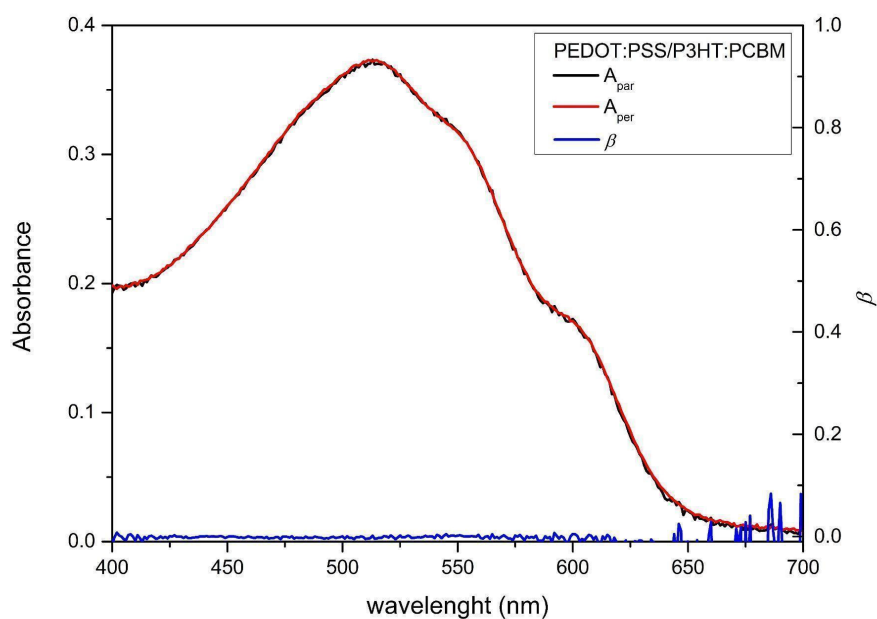


Figure S7. Parallel (A_{par}) and perpendicular (A_{per}) to the laboratory plane UV-Vis absorption spectra of sample PEDOT:PSS/P3HT:PCBM. The blue curve represents the molecular order parameter, β , in the spectral window of the absorption band.

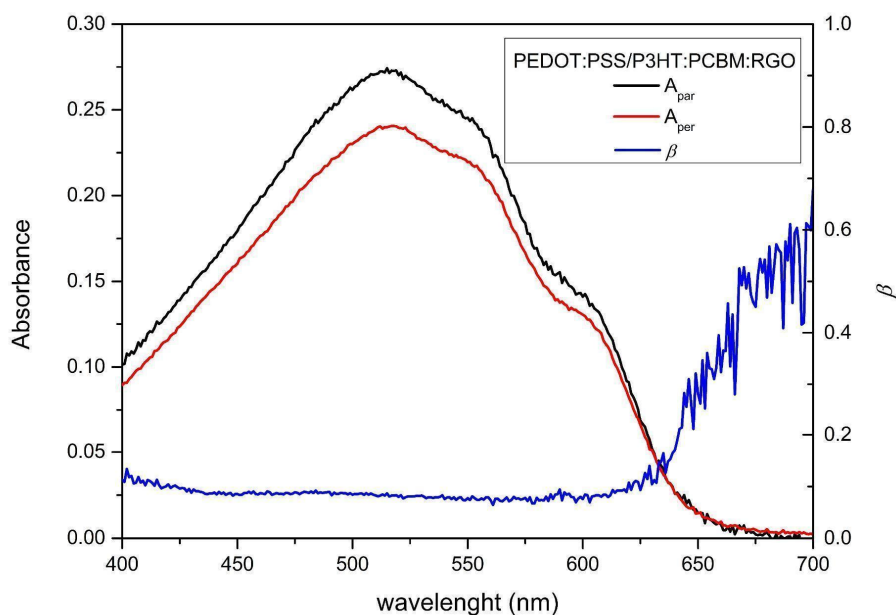


Figure S8. Parallel (A_{par}) and perpendicular (A_{per}) to the laboratory plane UV-Vis absorption spectra of sample PEDOT:PSS/P3HT:PCBM:RGO. The blue curve represents the molecular order parameter, β , in the spectral window of the absorption band.

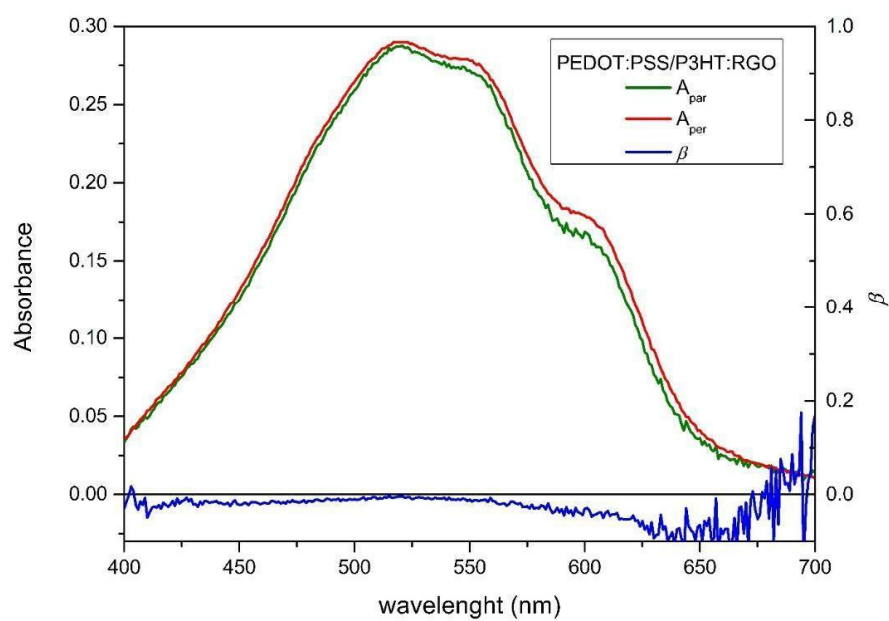


Figure S9. Parallel (A_{par}) and perpendicular (A_{per}) to the laboratory plane UV-Vis absorption spectra of sample PEDOT:PSS/P3HT:RGO. The blue curve represents the molecular order parameter, β , in the spectral window of the absorption band.