

Electronic Supplementary Information.

Species Selective Charge Transfer Dynamics in P3HT/MoS₂ van der Waals Heterojunction: Fluorescence Lifetime microscopy and Core Hole Clock Spectroscopy Approaches

Yunier Garcia-Basabe,^{‡,*} Gustavo G. Parra,[‡] Marina B. Barioni,[†] Cesar D. Mendoza,[†]
Flavio C. Vicentin,[†] Dunieskys G. Larrudé,^{‡,*}

[‡] Universidade Federal da Integração Latino-Americana, UNILA, 85867-970, Foz do Iguaçu, Brazil

[‡] MackGraphe-Graphene and Nanomaterial Research Center, Mackenzie Presbyterian University, 01302-907, São Paulo, Brazil

[†] Depto. Química, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto (FFCLRP), Universidade de São Paulo Ribeirão Preto, Brazil

[†] Departamento de Física, Pontifícia Universidade Católica do Rio de Janeiro, 22451-900, Rio de Janeiro, Brazil

[†] Brazilian Synchrotron Light Laboratory (LNLS), Brazilian Center for Research in Energy and Materials (CNPEM), 13083-970, Campinas, Sao Paulo, Brazil

* Corresponding author's e-mail address: yunier.basabe@unila.edu.br

Tel.: +55-45-3576-2113; Fax: +55-21-3938-7265

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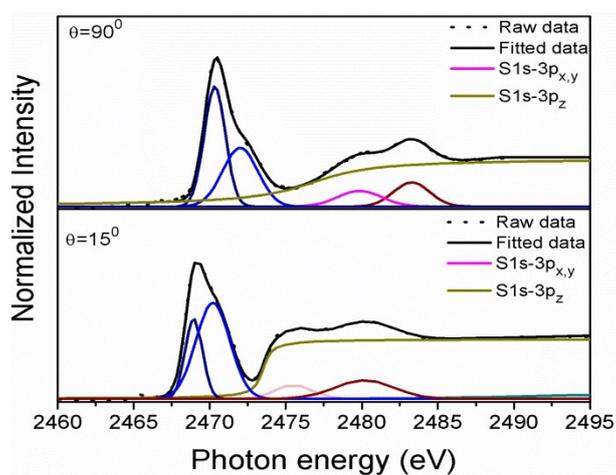
Figure S1. Polarized S K-edge NEXAFS dependence for: a) MoS₂/SiO₂, b) P3HT/SiO₂ and c) MoS₂/P3HT/SiO₂ films. The incident angle with respect to the film surface is also displayed on the graph.

Figure S2. The photon energy dependence of electron kinetic energy of decay channels a) MoS₂/SiO₂ and b) P3HT/SiO₂ thin films.

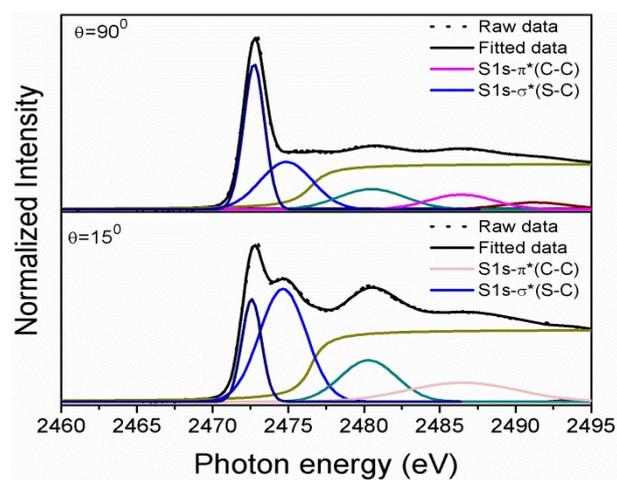
Figure S3. The left-hand spectrum displays the S 1s core level photoemission peak on P3HT. The right-hand figure displays the XPS valence band spectrum of MoS₂ thin film. A linear fit is used to determine the valence band maximum (VBM) of MoS₂ thin film. These two spectra determine the position of S 1s core level relative to MoS₂ (VBM) as indicated by the double arrow.

Figure S4. S K-edge NEXAFS spectrum of P3HT/MoS₂ heterojunction after the subtraction of the MoS₂ conduction band minimum (CBM) photon energy. The photon energy scale is aligned to the energy required to promote a S 1s electron to the MoS₂ CBM. The photon energy of MoS₂ CBM is estimated from the procedure described in Figure S3 and taking in account the MoS₂ optical band gap (1.8 eV).

a)



b)



c)

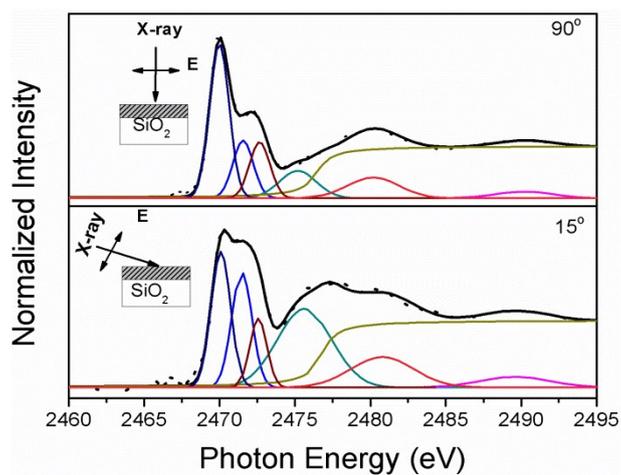


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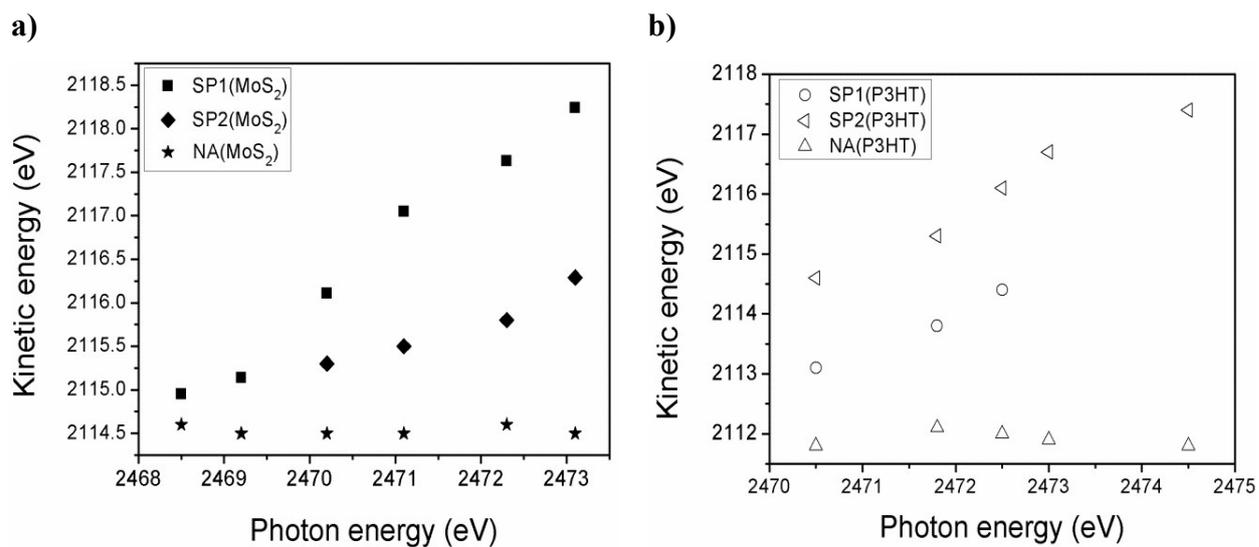


Figure S2. The photon energy dependence of electron kinetic energy of decay channels a) MoS₂/SiO₂ and b) P3HT/SiO₂ thin films.

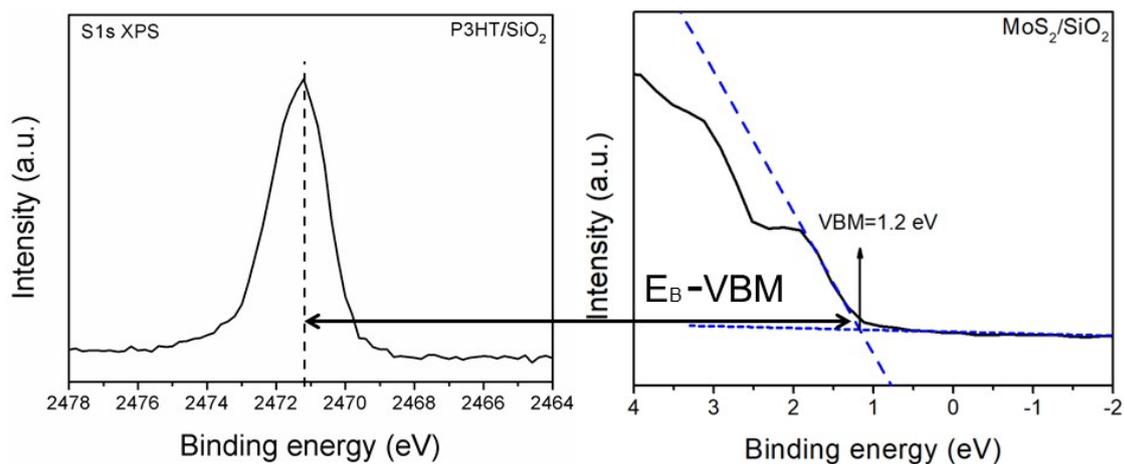


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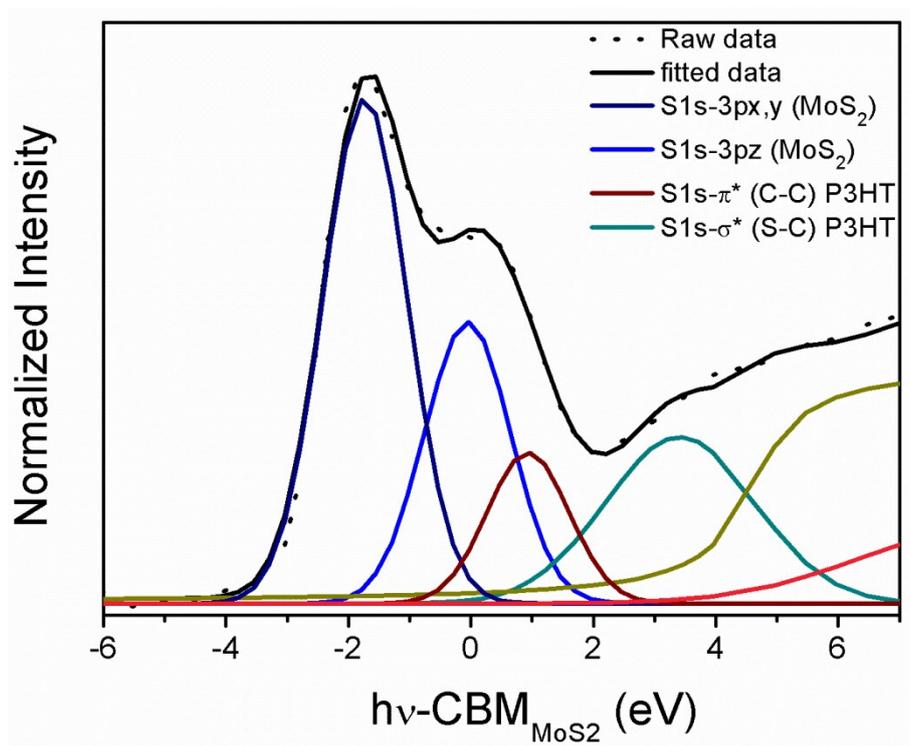


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