

Abstract Submitted
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Shedding Light on Solar Cells with Synchrotron Radiation FRANZ HIMPSEL, PETER COOK, PHILLIP JOHNSON, UW Madison, XIAOSONG LIU, WANLI YANG, ALS, ANGEL RUBIO, JUAN-MARIA GARCÍA-LASTRA, ENRIQUE ORTEGA, CELIA ROGERO, RUBEN GONZALEZ-MORENO, Univ. San Sebastian, ENEKO AZACETA, RAMON TENA-ZAERA, CIDETEC, San Sebastian, ELENA GUILLEN, JUAN ANTA, Univ. Sevilla — X-ray absorption and photoelectron spectroscopy with synchrotron radiation are used to systematically determine the energy levels of molecules for dye-sensitized solar cells (including porphyrins and phthalocyanines [1-3]). N 1s absorption spectra combined with theoretical modeling provide the unoccupied molecular orbitals and the charge transfer between the central metal atom and the surrounding N atoms. Metal 2p-to-3d spectra provide the oxidation state of the metal. Fe and Mn, which occur frequently in biological analogs, easily change their oxidation between +3 and +2. Some dyes interact with the electronic states of nano-structured ZnO acceptor electrodes, causing a change in the electronic states of the ZnO or the dye.

- [1] P. L. Cook, et al. J. Chem. Phys. 131, 194701 (2009).
- [2] P. L. Cook, et al. J. Chem. Phys. 131, 214702 (2009).
- [3] J.M. García-Lastra, et al., J. Chem Phys. 133, 151103 (2010).

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