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Photoinduced Charge Transport Spectra for Porphyrin and Naphthalene Derivative-based Dendrimers J.H. PARK, Y. WU, J.R. PARQUETTE, A.J. EPSTEIN, The Ohio State University, Columbus OH 43210 — Dendrimers are important chemical structures for harvesting charge. We prepared model dendrimers using two porphyrin derivatives and a naphthalene derivative. Films of these porphyrin derivatives have a strong Soret band ($\sim$430nm) and four significant Q-bands; the naphthalene derivative has strong absorption at 365 and 383nm. Two kinds of photovoltaic cell structures [ITO/BaytronP/(thick or thin) dendrimer/Al] are constructed to investigate the optical response spectra of dendrimers under electric potential(V) on the cell (range from -1V to 2V). To obtain pure optical responses, incident light is modulated with an optical chopper and a lock-in amplifier is used to measure current (I_{AC}) and phase (θ). For the excitation of the Soret band, I_{AC} and θ do not change substantially with change of sign and amplitude of V. For Q-bands and naphthalene absorption bands, θ nearly follows the polarity of V on the cells and I_{AC} is linear with V. Hence, I_{AC} is nearly ohmic for Q- band although there are shifts due to built-in-potential. I_{AC} for Soret band is almost same for thick and thin active layer cells. In contrast, I_{AC} increases with thickness increase for Q bands. Mechanisms of photogeneration and charge transport will be discussed.

June Hyoung Park
The Ohio State University

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