

Electronic Supplementary Information

The Influence of Intermolecular Coupling on Electron and Ion Transport in Differently Substituted Phthalocyanine Thin Films as Electrochromic Materials: a Chemistry Application of the Goldilocks Principle

Thi Hai Quyen Nguyen,^a Marius Pelmus,^b Christopher Colomier,^b Sergiu M. Gorun,^{b*} Derck Schlettwein^{a*}

^a Institute of Applied Physics and Laboratory of Materials Research, Justus-Liebig-University Gießen, Heinrich-Buff-Ring 16, 35392 Gießen, Germany.

^b Department of Chemistry and Biochemistry and Center for Functional Materials, Seton Hall University, 400 South Orange Ave, South Orange, NJ 07079, USA.

* corresponding authors email: schlettwein@uni-giessen.de; sergiu.gorun@shu.edu.

Figure S1. HRMS spectra of **F₄₀PcCu**. Experimental (top) vs. theoretical (bottom) isotopic distribution.

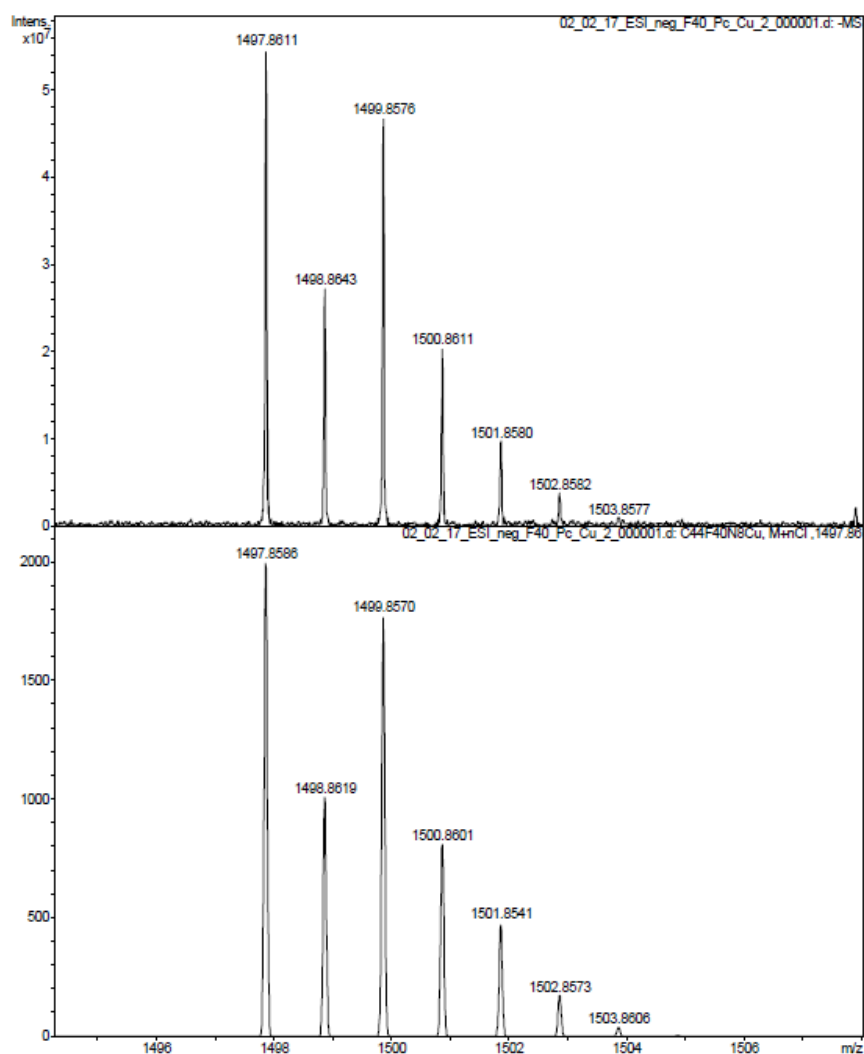
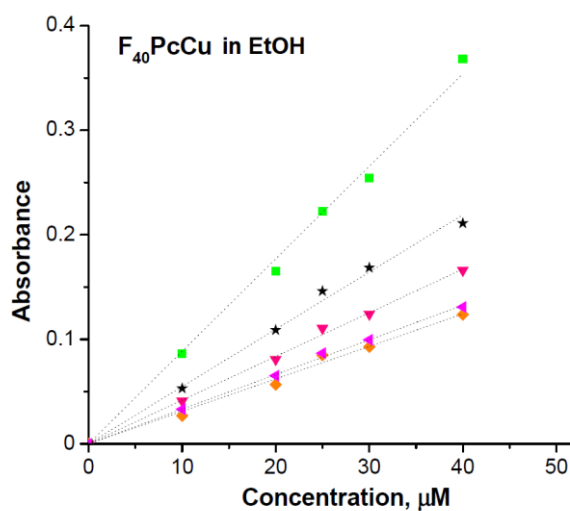
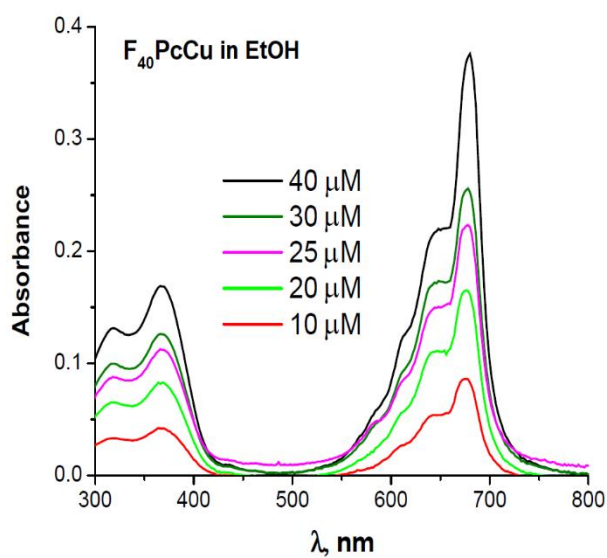
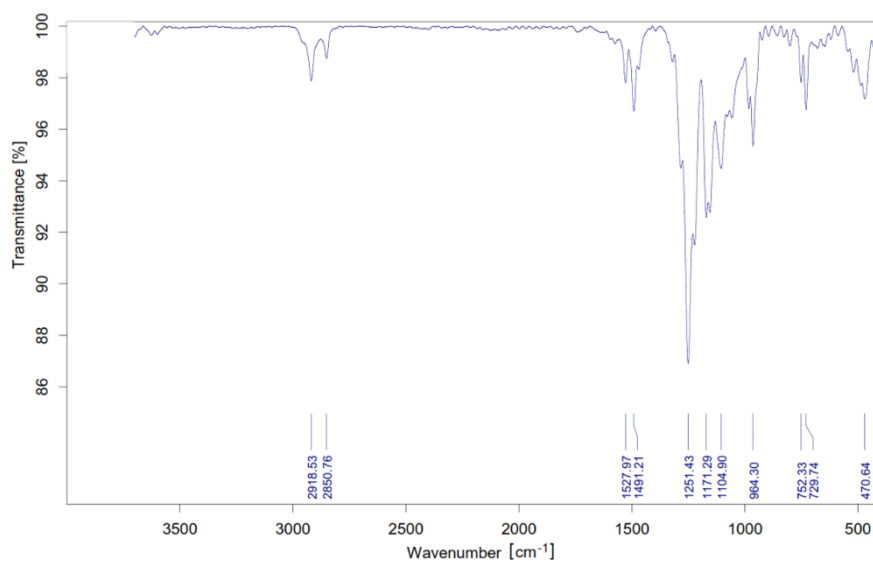


Figure S2. FT-IR spectrum of **F₄₀PcCu**, KBr disk



Symbol	λ , nm	Slope	R^2
■	676	0.00885	0.99796
★	640	0.00548	0.99813
◆	612	0.00311	0.99659
▼	372	0.00418	0.9991
▲	316	0.00332	0.99943

Figure S3. Concentration-dependent UV-Vis spectra of 10-40 μ M solutions of **F₄₀PcCu** in ethanol (EtOH), (left). Beer-Lambert plots (right).

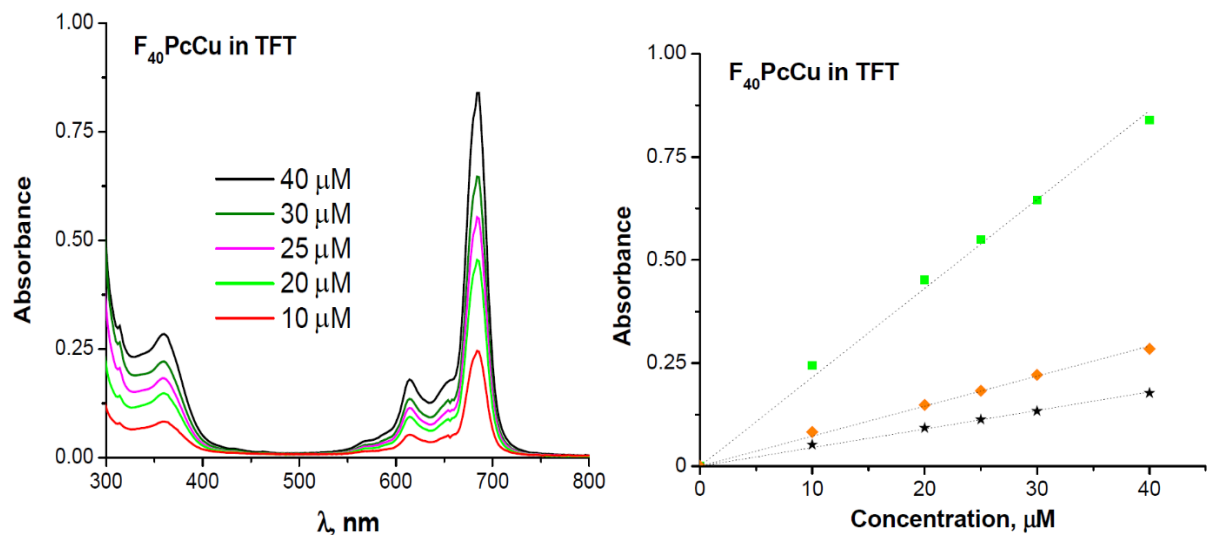


Figure S4. Concentration-dependent UV-Vis spectra of 10-40 μM solutions of **F₄₀PcCu** in trifluorotoluene (TFT), (left). Beer-Lambert plots (right).

Symbol	λ , nm	Slope	R^2
■	686	0.02156	0.99867
★	616	0.0045	0.99889
◆	360	0.00728	0.99895

Figure S5. Grazing incidence X-ray diffraction (GIXRD) of a 50 nm thin film of **F₄₀PcCu** on FTO compared to pristine FTO.

