Photoconductivity of Nanotapes Self-assembled from meso-Tri(4-sulfonatophenyl)monophenylporphine  

A. L. YEATS, B. MASSARE, W. F. SMITH, Haverford College, A. D. SCHWAB, Appalachian State U., J. C. DE PAULA, Lewis and Clark College, D. E. JOHNSTON, A. T. JOHNSON, U. of Pennsylvania — We have shown\(^1\) that meso-Tetra(4-sulfonatophenyl)porphine (TPPS\(_4\)) forms well-defined nanorods in acidic solution. Experiments on related molecules provide insight into the mechanisms for self-assembly and photoconduction. Meso-Tri(4-sulfonatophenyl)monophenylporphine (TPPS\(_3\)) has one fewer sulfonate group than TPPS\(_4\), but is otherwise identical. Previous work\(^2\) has shown that, when deposited onto substrates by rotary evaporation, it forms folded nano-ribbons. We have found that, when deposited via immersion and spin-drying, it forms tape-like aggregates of two distinct heights. The larger width of these nanotapes (compared to TPPS\(_4\) nanorods) is expected from the smaller in-solution charge of the monomer. The TPPS\(_3\) aggregates exhibit photoconductive properties very similar to those of TPPS\(_4\). The aggregates ordinarily form in solution, but can also be surface-catalyzed. \(^1\) A.D. Schwab et al., Nano Letters 4, 1261 (2004). \(^2\) J. Crusats et al., Chem Commun. 1588 (2003).

Andrew Yeats  
Haverford College

Date submitted: 20 Nov 2006  
Electronic form version 1.4