

Abstract Submitted  
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**Exploration of Excitonic States in Dilute Magnetic Organic Semiconductors**<sup>1</sup> LANE MANNING, NAVEEN RAWAT, CODY LAMARCHE, University of Vermont, LAUREN PALADINO, University of South Florida, ISHVIENE COUR, RANDALL HEADRICK, MADALINA FURIS, University of Vermont — The electronic and excitonic properties of mixed dilute metal/metal-free phthalocyanine crystalline thin films are explored. The immediate focus is on molecular systems containing Cobalt and Copper phthalocyanines in ratios to the metal-free phthalocyanines ranging from 1:1 to 1:10. The molecular thin film samples are deposited using a novel hollow pen-writing technique<sup>2</sup> that produce millimeter sized grains with long range macroscopic order. Electronic and excitonic states are investigated using temperature dependent absorption/transmission and photoluminescence spectroscopy. All optical characterization indicates a very uniform mixing of the species is achieved in films without loss of long range order previously observed in individual species. At low temperatures, a novel high energy state is observed. Its intensity is directly related to the ratio of metal to metal-free Phthalocyanine. In addition, a unique linear dichroism mapping is performed on these thin film samples, giving insight into electronic states both close to and far from grain boundaries.

<sup>1</sup>NSF DMR - 1056589, NSF DMR - 1062966

<sup>2</sup>R. Headrick et al, APL 92 063302 (2008)

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