

Abstract Submitted
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**Linear Dichroism and Photoluminescence Microscopy Imaging of
Grain Boundaries in Crystalline Metal-Free Phthalocyanine Thin Films¹**

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BURLINGTON, VT 05405 TEAM — We employed a combination of linear dichro-
ism and photoluminescence microscopy with spatial resolution of $5\mu\text{m}$ to study the
excitonic properties of solution-processed metal-free phthalocyanine (H2Pc) crys-
talline thin films with millimeter-sized grains. We observe a highly-localized, sharp,
monomer-like emission at the high angle grain boundaries, in contrast to samples
with more uniform grain orientation where no such feature has been observed. The
energy difference between the grain boundary luminescence and the HOMO-LUMO
singlet exciton recombination of the crystalline H2Pc is measured to be 160meV. Our
systematic survey of grain boundaries indicates this localized state is never present
at low angle boundaries where the π -orbital overlap between adjacent grains is sig-
nificant. It supports recent results which associated a decrease in carrier mobility
with the presence of large angle boundaries in similar crystalline pentacene films.

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