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**“Structural modifications to enhance exciton diffusion in porphyrin thin films and single crystals”**

Linking molecular orientation and structure with excited-state (exciton) dynamics is crucial for engineering efficient organic solar cells and related molecular electronics. The singlet exciton diffusion lengths ( $L_D$ ) of solution-cast thin films of carboalkoxyphenylporphyrins with various alkyl chain lengths and branching have been examined:

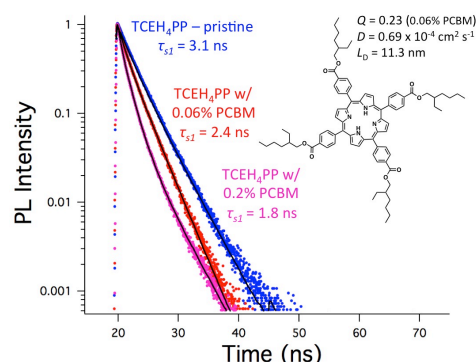


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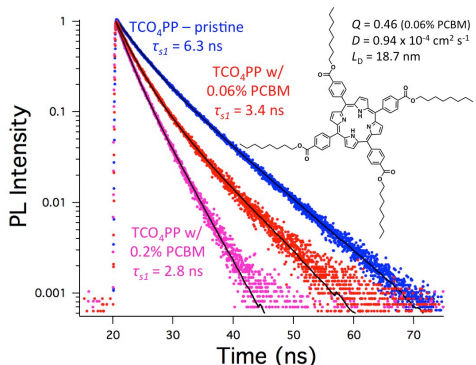
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1. The photoluminescent singlet decay lifetime PL(t) of pristine porphyrin films and films lightly doped (0.02 - 1% wt.) with [6,6]-phenyl-C61-butyric acid methyl ester (PCBM) were used to obtain a relative quenching efficiency (Q) and calculate exciton diffusion lengths.



2. We observed  $L_D$  ranging from from 18 nm for an octyl derivative to 25 nm for a hexyl porphyrin, while a branched alkyl chain derivative showed the lowest  $L_D$  of 11 nm. XRD data indicates that molecular organization is strongly dependent upon the peripheral carboalkoxy chain, and that nematic molecular organization resulted in an increase in the exciton diffusion length.