

Probing Hydrophobical Collapse of Starch Nanoparticles by Pyrene Fluorescence and Transmission Electron Microscopy

Wei Yi

Supervisor: Prof. Jean Duhamel

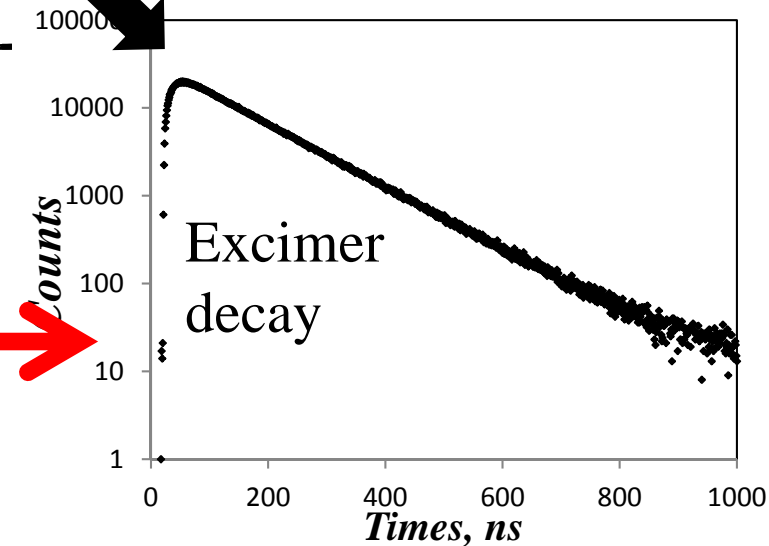
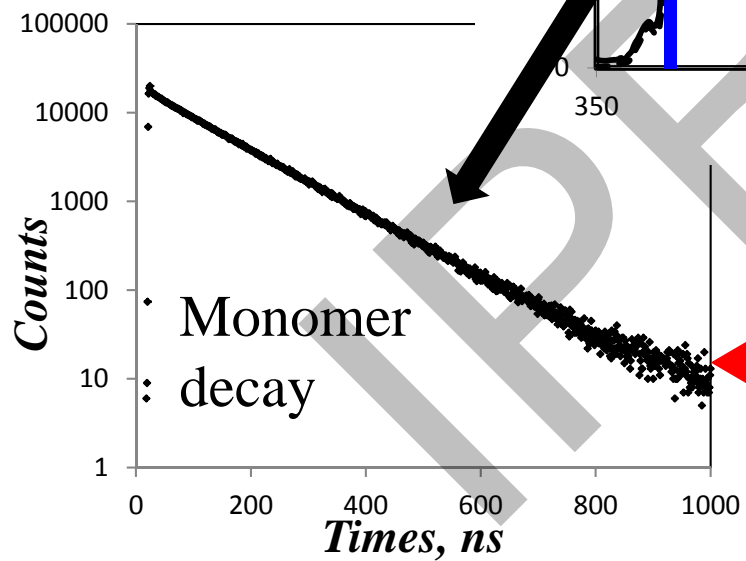
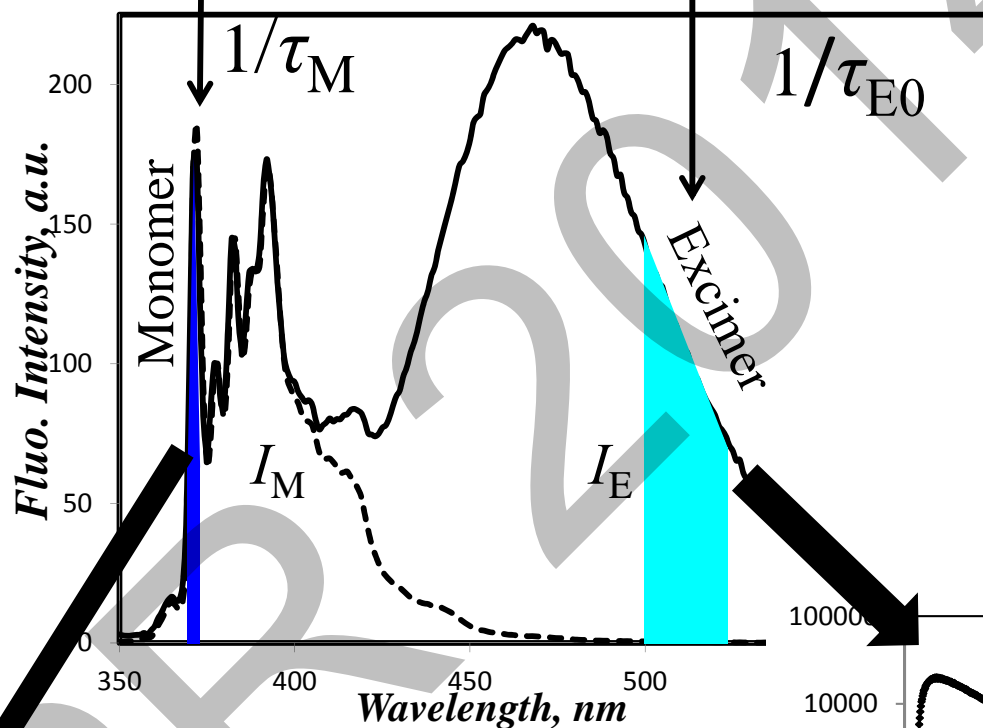
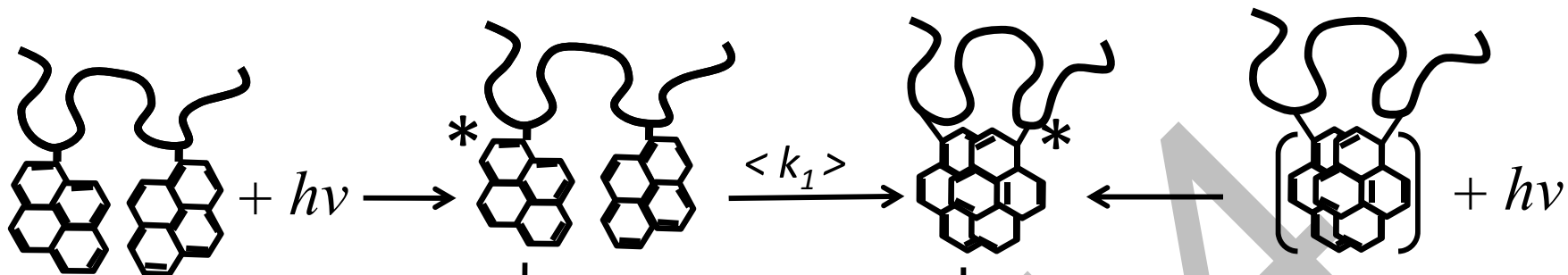
May, 21st 2014

UNIVERSITY OF
WATERLOO



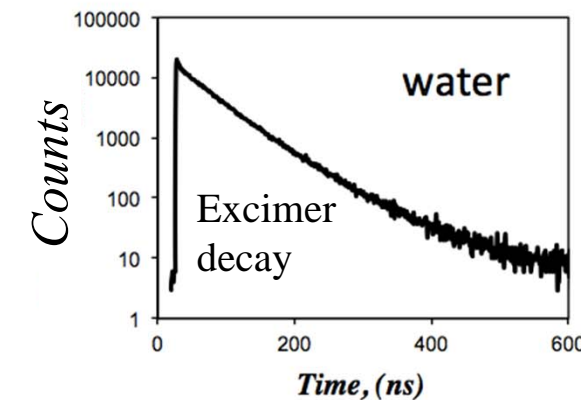
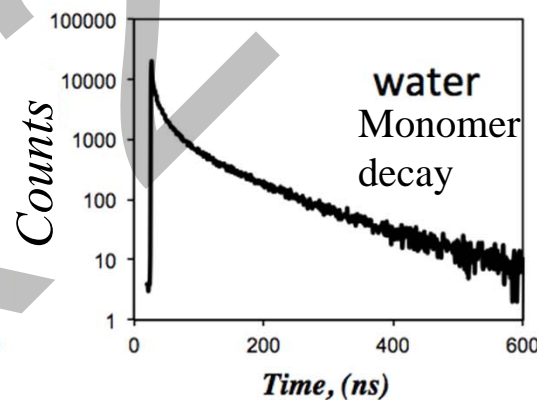
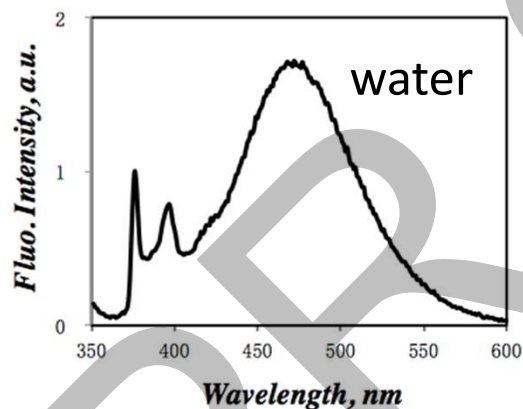
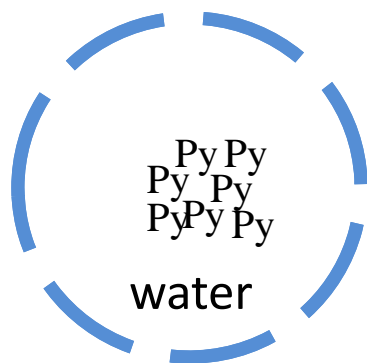
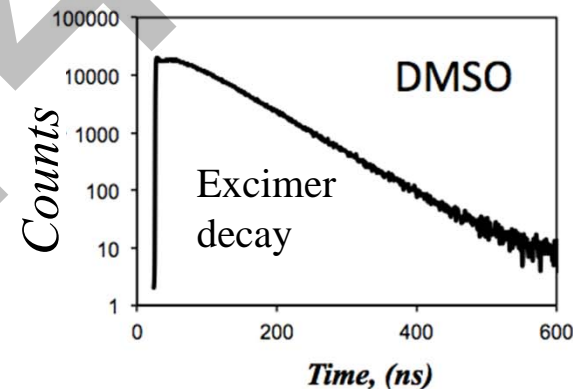
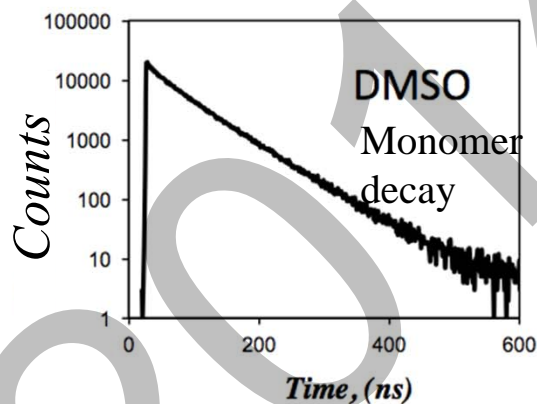
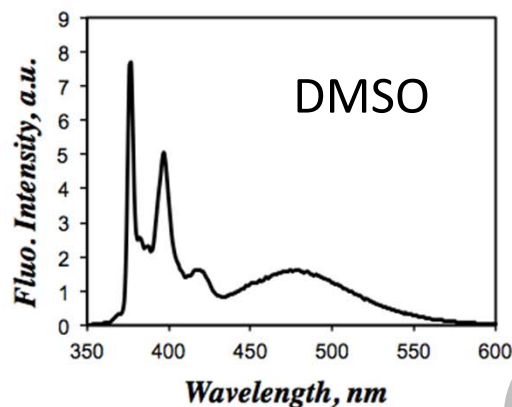
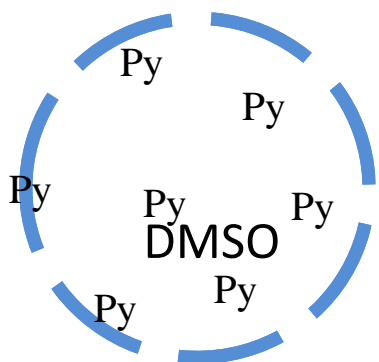
ECOSYNTHETIX®
SUSTAINABLE POLYMER FOR PLANET EARTH™

IPR
Institute for Polymer Research



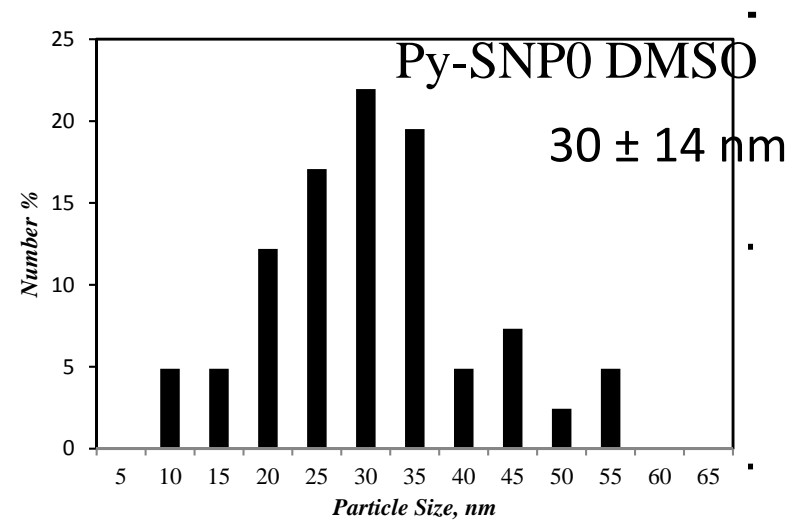
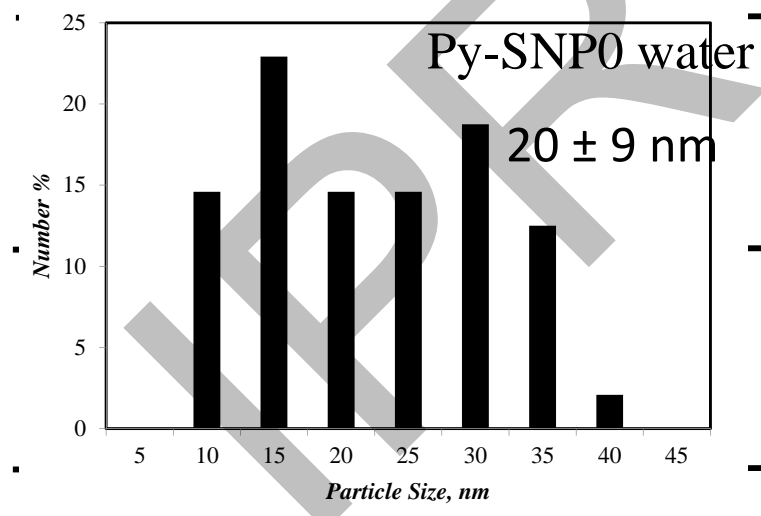
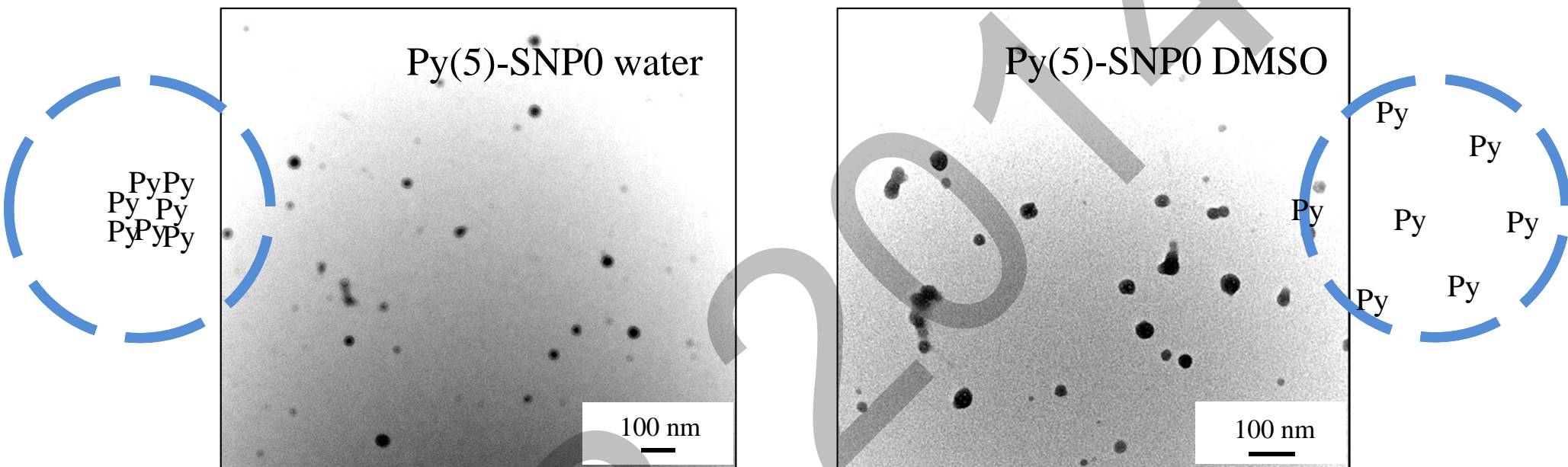
Coupled

Hydrophobic Effect on the Py-SNPs in Water



Solvent	η @25°C mPa.s	I_E/I_M	$\langle k \rangle$, μs^{-1}	f_{diff}	f_{free}	f_{agg}
DMSO	1.99	0.68	9.8	0.80	0.02	0.18
Water	0.89	5.65	52.1	0.05	0.00	0.95

Morphology of the Py-SNPs in Water



Acknowledgements

UNIVERSITY OF
WATERLOO

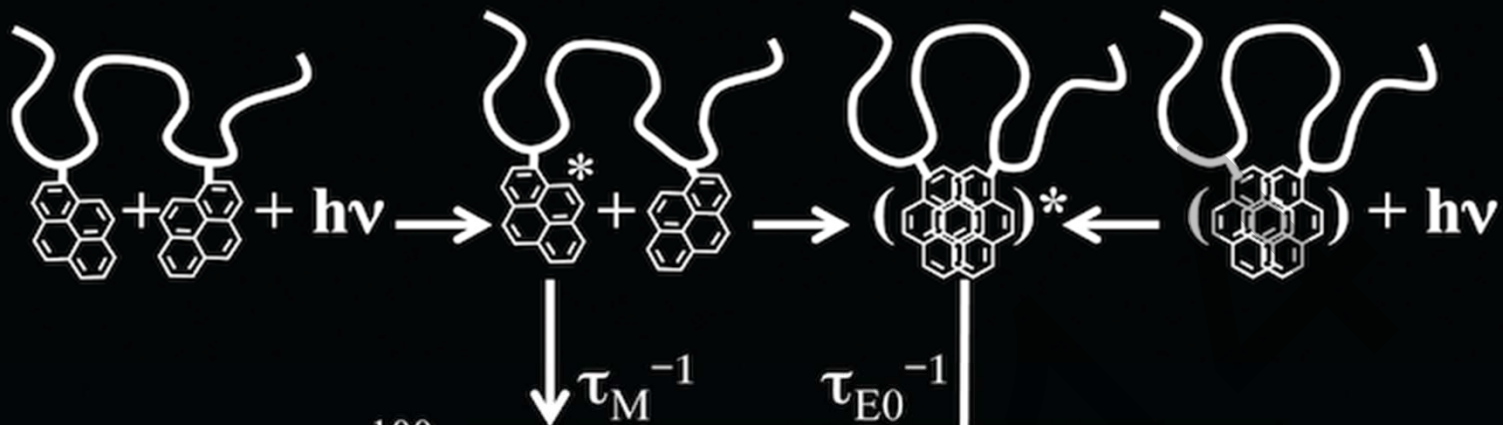


- Dr. Jean Duhamel
- Duhamel & Gauthier group
- ECO-WIN team

 **ECOSYNTHETIX**[®]
ADVANCED POLYMERS FROM PLANET EARTH[®]



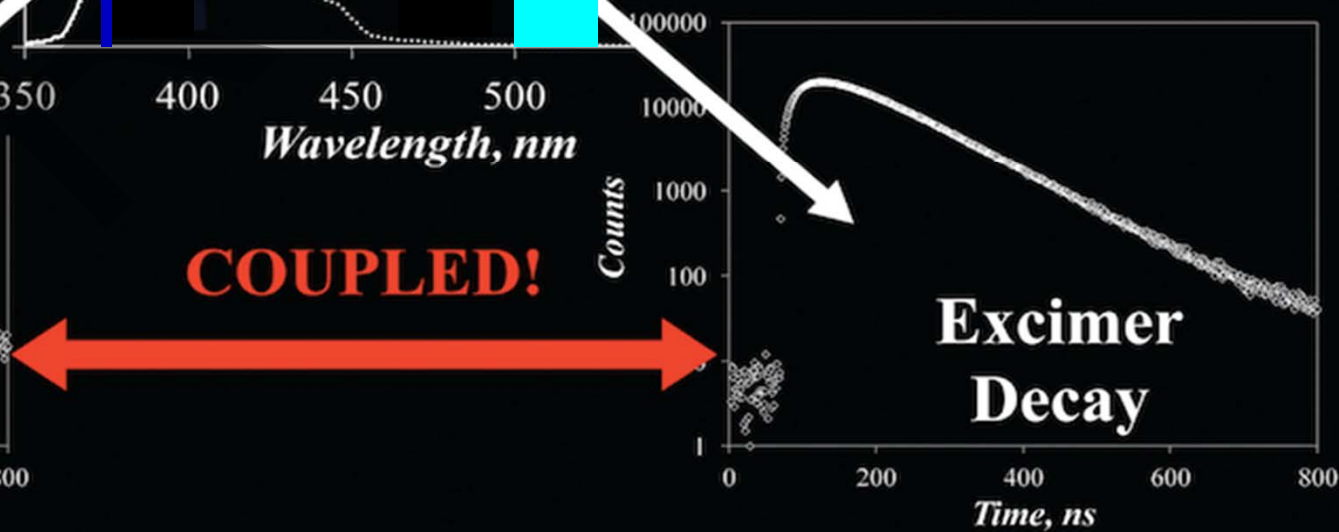
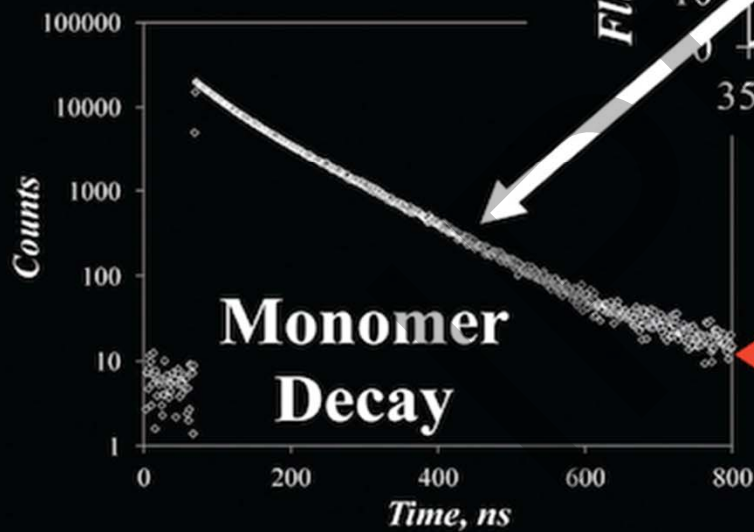
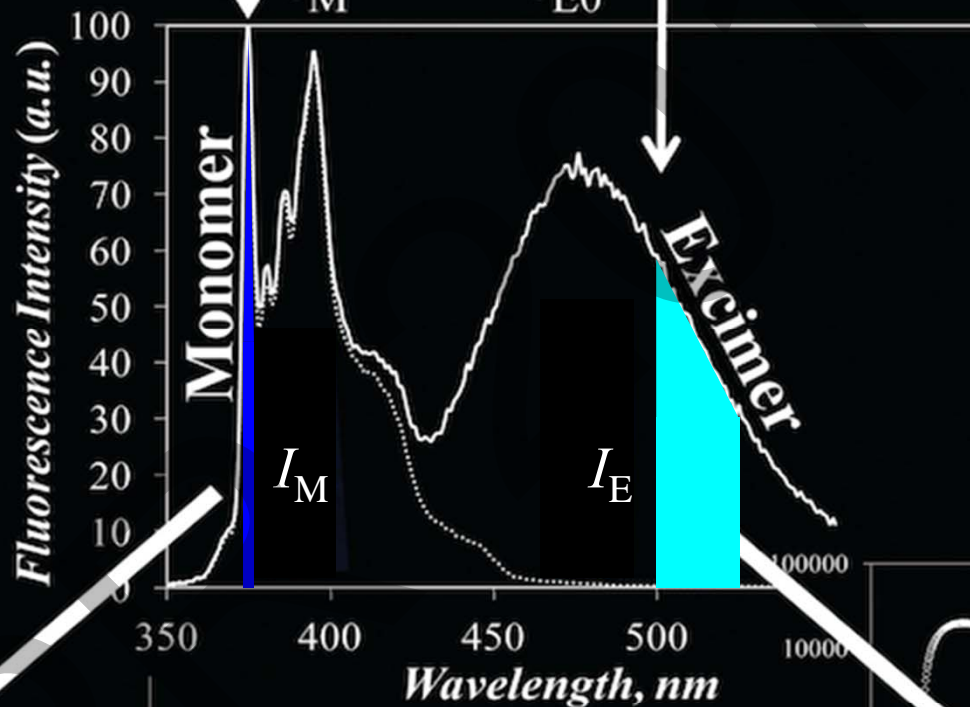
NSERC
CRSNG



$$I_E/I_M = Kk_1[\text{Py}]_{\text{loc}}$$

k_1 is the diffusion rate constant

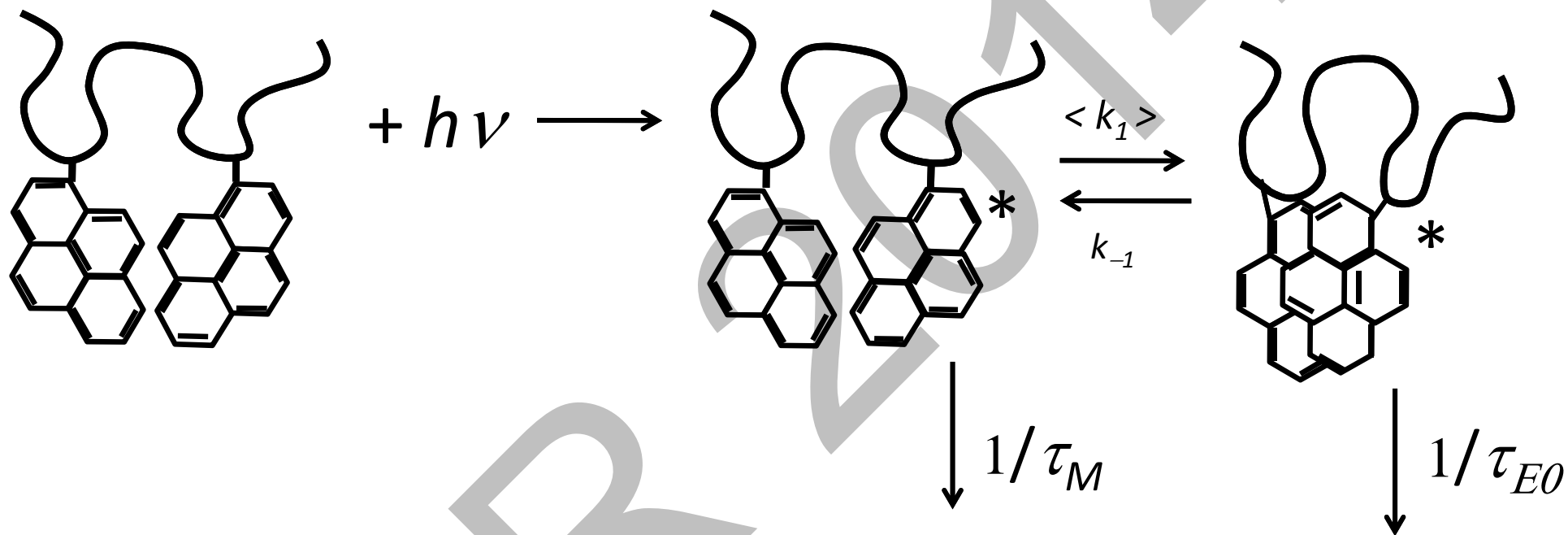
$[\text{Py}]_{\text{loc}}$ is the local pyrene concentration



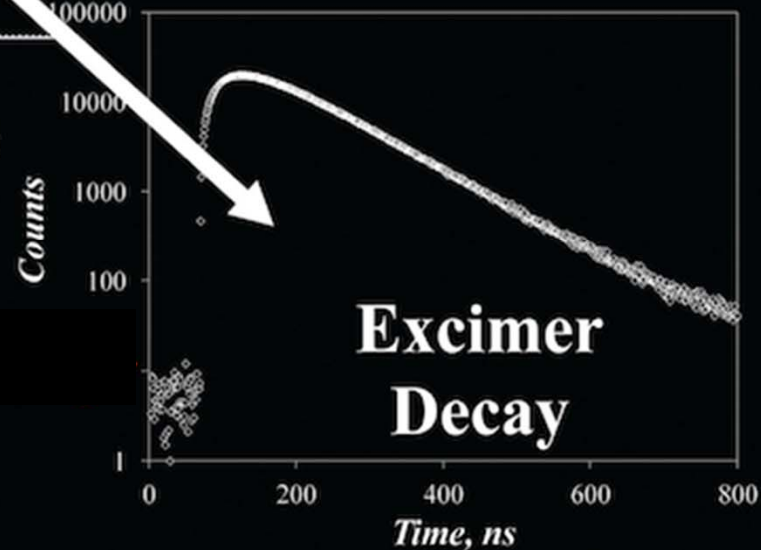
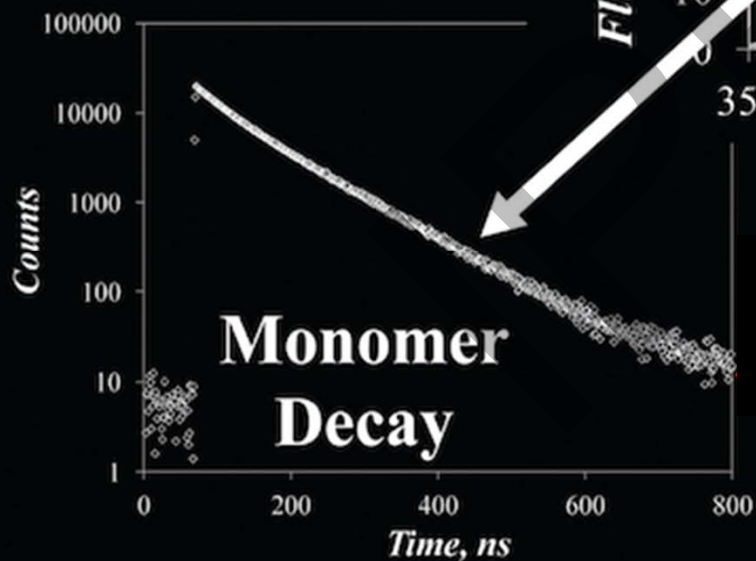
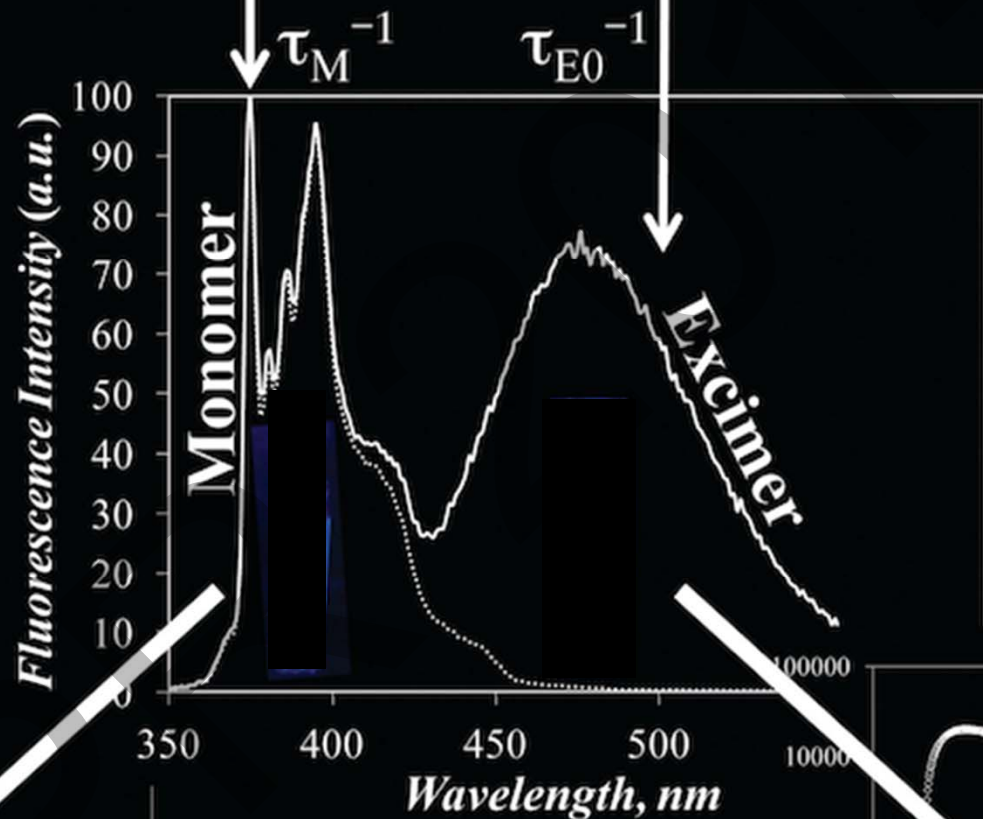
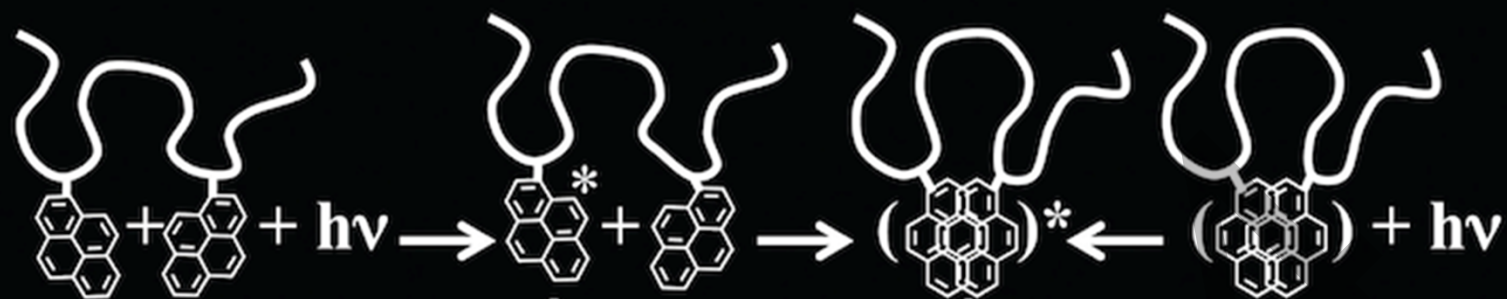
COUPLED!

3. Analysis

Kinetics for pyrene excimer formation



Monomer Emission I_M : 372 - 378 nm	Excimer Emission I_E : 500 - 530 nm
--	--



TEM Size Distribution of SNPs

