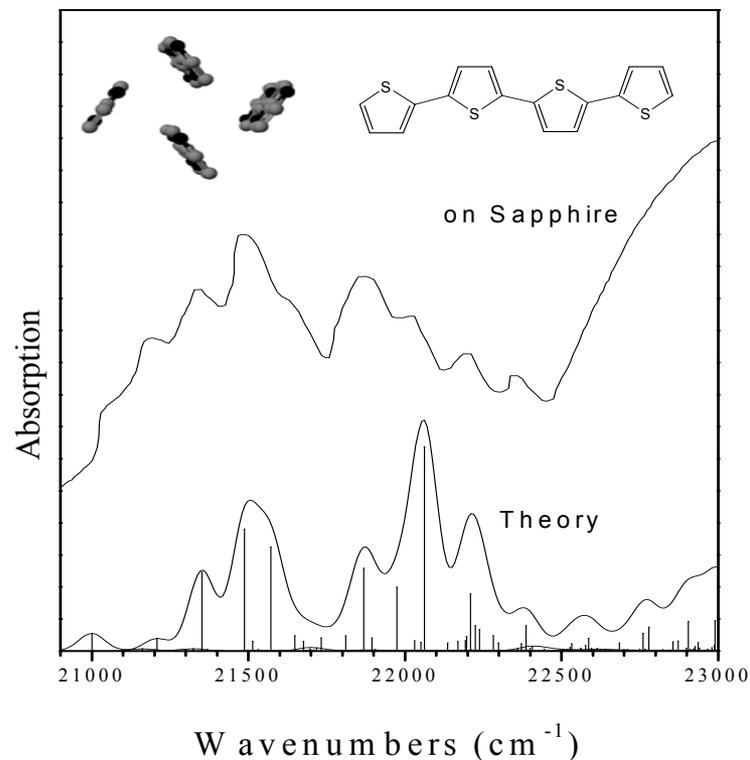


Optical Excitations in Aggregates, Films and Crystals of Conjugated Oligomers and Polymers

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Thin films of conjugated organic molecules and polymers are receiving widespread attention as semiconductors in applications such as flat-panel displays, electronic labels and even solid-state lighting. However, despite intense experimental effort, there remains much that is unknown about how organic thin films transport charge and energy and interact with light. Our work is dedicated to developing theoretical models of light absorption and emission in molecular aggregates, films and crystals of conjugated oligomers and polymers. The photophysics is influenced by intermolecular interactions, the coupling between electronic transitions and molecular vibrations, and the presence of structural and point defects. Of particular importance are the initial photo-excited states. The close agreement between the simulated and experimental absorption spectra of OT4 films on the right allows us to understand the nature of the excited states.



Comparison of the experimental low energy absorption spectrum of OT4 deposited on sapphire with theory. The inset shows the pinwheel aggregate as viewed down the long molecular axis.