

Title : Synthesis, Photophysical Properties Investigations of *o*-Hydroxy Benzimidazole and Their Applications as Down-Conversion in the Perovskite Solar Cells.

Author(s) : 1. Miss Chanita Aikhuai

Student ID : 640510016

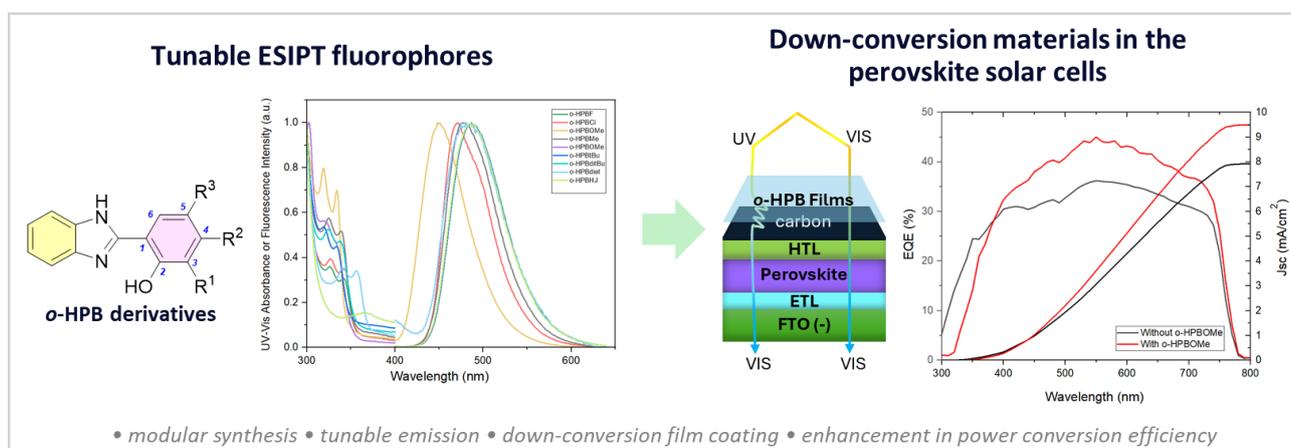
Major : Chemistry

Advisor(s) : 1. Assistant Professor Dr. Natthawat Semakul

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 Cooperative Education (กรณี นำเสนอผลงานสหกิจศึกษา)

ABSTRACT

Fluorescent molecules exhibiting excited-state intramolecular proton transfer (ESIPT) have attracted significant interest due to their large Stokes shifts and unique photophysical properties. However, tuning these fluorophores for optimal fluorescent emission remains a challenge. In this study, *o*-hydroxyphenyl benzimidazole (*o*-HPB) derivatives featuring various electron-withdrawing and electron-donating groups were synthesized via the oxidative condensation of *o*-phenylenediamine and salicylaldehyde derivatives. Their photophysical properties were systematically investigated, revealing structure-dependent emission behaviors in the range of 440–510 nm. Among the synthesized derivatives *o*-HPBOMe was preliminarily applied in down-conversion films, demonstrating an enhancement in power conversion efficiency (PCE) in perovskite solar cells. The results shed light on the structure-fluorescence relationship, providing valuable insights for designing fluorophores for energy-related applications.



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