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HANDBOOK OF AGGREGATION-

HANDBOOK OF

AGGREGATION- INDUCED EMISSION

VOL. 2 TYPICAL AIEGENS DESIGN

YOUHONG TANG | BEN ZHONG TANG EDITORS

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TYPICAL AIEGENS DESIGN

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Development of a New Class of AIEgens

Tetraarylpyrrolo [3,2- *b*] Pyrroles (TAPPs)

Vishal G. More, Ratan W. Jadhav, Mohammad Al Kobaisi, Lathe A. Jones, Sheshanath V. Bhosale

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Summary

Luminogens that exhibit aggregation-induced emission – the so-called AIEgens – have emerged as important supramolecular materials, as their strong emission in aggregated states allows implementation in applications where the undesirable aggregation-caused quenching (ACQ) effect would be deleterious. AIEgen-based materials are promising for applications in the fields of photoluminescent materials, sensing, drug/gene delivery, bioimaging, and theranostics. In this chapter, we discuss the class of AIEgens based on tetraarylpyrrolo[3,2- *b*]pyrrole (TAPP) molecules and their derivatives, obtained through various synthetic routes (via Knoevenagel reaction) and their emerging applications. TAPP derivatives are shown to be effective AIEgens and can be synthesized in a single step from easily available starting materials. The products can be isolated by simple filtration without the need for column chromatography and can also be functionalized to suit targeted applications. Given the electron-rich nature of the TAPP core, it is not surprising that most applications are found in areas where interaction with light is paramount, such as optoelectronics, imaging, and solar cells. We have demonstrated in this chapter how the synthetic versatility of the TAPP core can be leveraged to control the absorbance, emission, and physical properties of the analogues, allowing fine-tuning of properties for each application.