

SYNTHESIS AND STUDIES OF THIOXANTHONE BASED DERIVATIVES EXHIBITING TADF, AGGREGATION INDUCED EMISSION ENHANCEMENT AND RTP

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For the past few decades organic light emitting diodes (OLEDs) have been a widely researched field in organic optoelectronics. A great deal of research has been made in effort to achieve highly efficient materials for various high-resolution OLED displays and lightning devices [1]. Thermally activated delayed fluorescence (TADF) emitters have been recently attracting much attention due to their ability to push the internal quantum efficiency of OLEDs up to 100% of their theoretical value [2]. TADF enables the possibility of harvesting both singlet and triplet excitons due to very low energy gap (ΔE_{ST}) in most cases <100 meV.

Recently, two different thioxanthone based emitters were reported showing good thermal stability, high external quantum efficiency of OLEDs (up to 21,5%) and aggregation-induced emission enhancement (AIEE) and TADF capabilities [3]. OLEDs containing thioxanthone-based material characterized by efficient TADF showed external quantum efficiencies ranging from 11 to 13.6% [4].

In this work, four thioxanthone based derivatives with different donor fragments were synthesized and their thermal, electrochemical, photophysical properties were investigated. It was discovered that some of the aforementioned materials not only exhibited TADF and AIEE effects, but also showed room temperature phosphorescence. OLEDs with maximum external quantum efficiencies up to 8% were fabricated using thioxanthone-based derivatives.

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[4] Zhiheng Wang, Yunchuan Li, Xinyi Cai, Structure—Performance Investigation of Thioxanthone Derivatives for Developing Color Tunable Highly Efficient Thermally Activated Delayed Fluorescence Emitters, *Applied Materials & Interfaces* **8**, 8627-8636 (2016).