



第275回 OPERA研究交流セミナー

第266回 ISIT有機光エレクトロニクス研究特別室セミナー

第333回 未来化学創造センターセミナー



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Merging TADF and CPL: a journey into structure-properties relationship of emergent materials for display applications

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During the last decade, OLEDs have been widely developed for applications in lighting and electronic devices. This progress has been made possible thanks to significant advances in the field of electrical-to-light conversion. In particular, Thermally Activated Delayed Fluorescence (TADF) has enabled researchers to overcome the theoretical limitations of conventional fluorescent emitters and to circumvent the issues associated with phosphorescent ones. However, in the context of display applications, such as screens for cellphones, computers, televisions, and more, devices must be equipped with anti-glare filters. The purpose of this additional layer is to cancel the reflection of external light on the OLED panel. In most cases, however, anti-glare filters also block part of the light emitted by the OLED (up to 50%) drastically limiting the efficiency of the device. In this context, circularly polarized luminescent (CPL) emitters appear as promising materials, as they can pass through the filter without attenuation. Therefore, combining TADF and CPL properties in OLED applications would be a highly effective strategy, enabling both efficient conversion of electrical energy into light and optimal transmission to the user without significant loss. In this respect, we have been developing CP-TADF emitters for several years in order to identify the key structural parameters that maximize energy conversion into light while maintaining strong circularly polarized emission. In this research, we initially focused on molecular designs based on twisted intramolecular charge transfer systems incorporating BINOL as a chiral unit, and we studied the impact of both minor and major structural modifications on their properties. Based on these results, other molecular frameworks have been envisioned and investigated.

主催: 九州大学 最先端有機光エレクトロニクス研究センター

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