

CARBAZOLE DERIVATIVES WITH PYRIDINIUM ION AS EMITTERS FOR LIGHT-EMITTING ELECTROCHEMICAL CELLS

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Light-emitting electrochemical cells (LEC) are relatively easy-to-fabricate thin-film lighting devices. Therefore, LECs have been already successfully used in high-end smart lighting applications such as light-emitting clothes and emissive textiles, rollable and stretchable wallpaper-like lamps, and biocompatible light sources for in vivo or epidermal medical devices. However, most of the LECs utilise ionic metal complexes as emitters that consist of the rear element Iridium. Ionic small molecules (SM) as light emitters could be a better solution to the low-cost device.

In the work, we have investigated purely organic ionic compounds that could exhibit aggregate induced emission. The compounds consist of the carbazole group and pyridinium ion as a cation. Perchlorate was used as an anion. Emission spectra, fluorescence kinetics and photoluminescence quantum yield (PLQY) were measured in polymer doped thin films. Polymethyl methacrylate and polyethylene oxides were used as polymers. All compounds emitted light from 400 to 550 nm range with the PLQY up to 50%. Time-resolved spectroscopy revealed two processes with the time constant of few and a few hundred nanoseconds while no changes in the emitted light spectra were observed. From this, it can be concluded that in all cases there is the same proposed condition, which is populated through different mechanisms. In the end, LEC cells with the simple structure ITO/PEDOT:PSS/Emitter/Al were prepared and investigated. The detailed results discussing the impact of the molecule structure and chosen polymers on the optical and LECs properties will be presented.