

Circularly polarized red-NIR emission from achiral $[\text{Mo}_6\text{I}_8(\text{OCOC}_2\text{F}_5)_6]^{2-}$ cluster anion embedded in a bent-core liquid crystal host

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Circularly polarized luminescence (CPL) materials have attracted wide research interest in the past few years, due to their applications in optical data storage, display devices, biomedicine etc. While significant efforts have focused on enhancing the dissymmetry factor and the brightness of CPL emitting materials [1], mainly in the UV-visible range, efficient CPL materials in the red-NIR window remain rare. Here, we present a simple approach to obtain hybrid organic-inorganic materials exhibiting strong red-NIR CPL with extensively large g_{lum} values up to 0.19. These hybrids are obtained by mixing a red-NIR phosphorescent achiral octahedral molybdenum cluster compound [2] with a chiral bent core liquid crystal that self-assembles into helical nanofilaments [3]. Photophysical studies show that the emission of the inorganic nanoemitter is not affected by the organic matrix while POM, SAXS and DSC studies demonstrate that the self-organization of the host is only altered at cluster concentration higher than 5wt% which in turn leads to a decrease of the g_{lum} value.

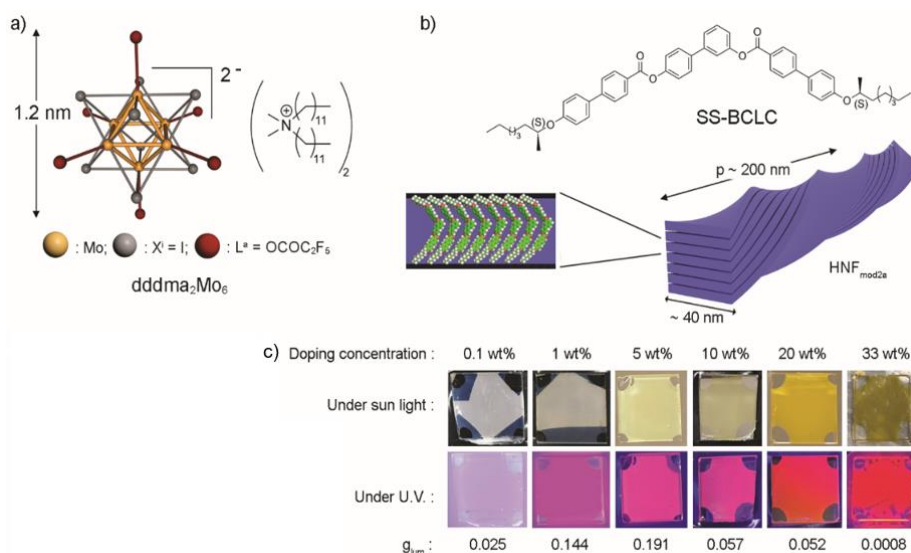


Figure 1. Representation of a) the NIR red phosphorescent molybdenum octahedral cluster compound ($\text{dddma}_2\text{Mo}_6$); b) the SS-bent core liquid crystal molecule that self-assembles into a helical nanofilament ($\text{HNF}_{\text{mod}2a}$) structure; c) obtained devices containing various amount of molybdenum cluster compound.

References

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