Excitonic interaction in Quasi-2D Ruddlesden-Popper type perovskite materials for realizing white light emission in single structure

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It is hard to fabricate white emission device driven by electroluminescence because the material that emits light in different areas has to be stacked in several layers. In device fabrication, not only the emission range but also the energy level that induces efficient recombination of electron-hole pairs must be considered. If white light emission occurs within single structure or from a single material, this consideration is not necessary. To realize white light emitting materials in single structure perovskite materials, we introduced imide based aromatic ammonium cation into the quasi-2D layered perovskite materials in order to increase of the low energy short wavelength region. In the film forms of perovskite materials, the films showed two photoluminescence spectra that have excitonic emission of metal halide perovskite materials and large Stokes-shift emission. Also, the large stokes-shift emission range has very slow decay until millisecond range. The emission result from the energy transfer from perovskite lattice to aromatic ammonium cation. From our research, utilizing this energy transfer strategy for white emission in single structure is effective.