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Preparation and luminescence studies of a CuI cluster with theobromine for application in displays.

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Inorganic luminescent materials are substances that emit visible or invisible light when excited by some form of energy. These materials are widely used in various applications due to their special optical properties. The coordination chemistry of copper(I) iodide continues to attract broad interest. Several remarkable factors arise from the d^{10} electron configuration of Cu(I) and the softness and flexible hybridization of Iodide, such as a variable metal coordination sphere, and variable $[Cu_xL_y]$ x−y cluster formation mediated through iodide bridging. [1] These CuI clusters exhibit high intensity fluorescence emission and are promising candidates for application in displays. The complex [Cu4L4TB4] was prepared using three different methodologies: in solution, mechanochemical synthesis, and also solvothermal methods. [2] In all methodologies, we obtained the same species, confirmed by elemental analysis and thermal analyses (Figure 1).
The complex exhibits absorption in the 337 nm region and has a strong emission at 470 nm, with a lilac color tending towards blue. Low-temperature emission studies aimed at understanding the electronic structure as well as the existence of thermochromism are underway. Focusing on this area of knowledge, we present the work on the preparation of the complex $[Cu_4L_4TB_4]$ (TB = theobromine) and initial studies of its fluorescent emission.

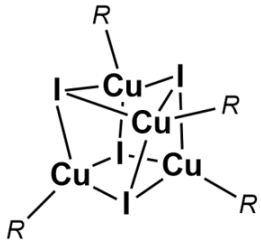

Figure 1 - Proposed structure of the complex $[Cu_4L_4R_4]$ (R = Theobromine).

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References

[1] C. Chen, Angewandte Chemie Int. Ed., 57, 7106 (2018).
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