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Lanthanide-Activated Nanoparticles: Application for Personalized Cancer Treatment and Temperature Control of Cancer Cells

The project focuses on exploring an optically active nanomaterial based on perovskites triply-doped with Cr3+ and thoughtfully selected Ln3+ ions (Ln(1)=Sm, Eu, Yb and Ln(2)=Er) with near-infrared (NIR) afterglow emission and persistent luminescence thermometry properties. The research aims to uncover potential application of such materials in theranostic approaches to biomedicine. These materials are synthesized for diagnostic purposes and utilize their thermoluminescent (TL) capability to concurrently measure the temperature of specific cells or organelles during targeted cancer treatment. Such temperature monitoring under physiological conditions could offer valuable insights for controlling localized magnetic or optical hyperthermia effects. Additionally, the project conducts comprehensive photoluminescence measurements, including absolute quantum yield emission (QY) at room temperature, along with photoluminescence (PL), photoluminescence excitation (PLE), and emission decay curves (DEC) generated by various dopants. These detailed analyses offer crucial insights into the material's behavior and performance within the physiological temperature range, crucial for advancing its potential biomedical applications. The findings will be shared at a poster presentation for comprehensive in-depth discussion.

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References

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