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## Unveiling the Biomedical Potential of Luminescent Materials Exploring their Concerted Thermoluminescent and Thermometric Performance

Luminescent thermometers exhibiting also thermoluminescence effect are of great interest in various fields including chemistry, biology, and medicine. They have significant potential as effective tools, particularly in optical imaging of tumor tissues and simultaneous temperature readings with the spatial resolution at the level of single cells.

Promising compounds demonstrating both thermoluminescence and luminescence thermometry effects are triple-doped perovskites with lanthanum aluminate as the matrix. They are activated with Cr3+ ions and chosen lanthanide ions, for example Sm3+ and Ho3+. Research on these materials focuses on their ability to simultaneously exhibit two physical phenomena: near-infrared (NIR) afterglow emission and the read-out of the temperature through the thermoluminescence. Combination of such effects and their control show potential for simultaneous cancer cells imaging and overheating them to death by means of controlled luminescence effects.

The project is at its very early stage. Synthesized materials will be characterized for their phase purity (XRD), IR spectroscopy, and morphology (SEM/TEM). Standard optical measurements at room temperature (emission spectra (PL), excitation spectra (PLE), and time-resolved luminescence dynamics of activators) will also be performed to recognize the phosphors capabilities. The results of the above studies will be presented at a poster presentation.

## References

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