

Advancing the biomedical applications of nanophosphors through the synergy of thermoluminescence and luminescent thermometry

Luminescent nanomaterials are becoming an increasingly fascinating area of research, especially considering their potential application in medicine, particularly in personalized cancer therapy projected to be the next giant step in the development of medicine.

Within the scope of this project, innovative luminescent nanomaterials will be developed, characterized by both, long-lasting luminescence and the ability for precise temperature measurement through the thermoluminescence effects. Our research will focus on synthesizing LaAlO₃ perovskite activated by Cr³⁺ ions. We are particularly interested in the influence of co-doping LaAlO₃:Cr with selected lanthanide ions. The project includes also their comprehensive physicochemical and spectroscopic characterization, as well as in-depth analysis of their temperature-dependent properties.

These materials have the potential for application in personalized cancer therapy through diagnostics and controlled hyperthermia generation. Detailed spectroscopic analysis under physiological temperature conditions will enable the utilization of these materials in optical imaging of tumor tissues and precise temperature measurement through temperature-dependent luminescence. The results of these studies are crucial for further development of personalized cancer therapy and medical diagnostics.

References

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