

Energy transfer in lanthanide-based compounds and its influence on luminescent materials

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Luminescent materials using trivalent lanthanide ions (Ln^{3+}) have attracted significant interest for their applications in electronics and medicine, specifically for measuring local temperature [1]. While the luminescence properties can be well-characterized through measurements, this is typically determined after the synthesis of the material. To overcome this time-consuming approach, theoretical calculations can offer a smarter design for new luminescent Ln^{3+} -based materials.

In this lecture, it will be presented how to model and understand energy transfer processes that may guide the luminescent properties of lanthanide-based compounds, including temperature effects in luminescence thermometry. The audience will be in contact with the JOYSpectra web platform [2], which can simulate energy transfer processes and estimate the emission quantum yield as well as the emission spectrum of these materials.

[1] A. Bednarkiewicz, L. Marciniak, L.D. Carlos, D. Jaque, *Nanoscale* 12 (2020) 14405.

[2] JOYSpectra web platform, version 2.0, accessible through <http://www.joyspectra.com.br>