From Basics to Advanced: Intensity and Energy Transfer in Lanthanide-based Compounds

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The aim of this tutorial lecture is to explore the fundamental aspects of intensity in lanthanide-based compounds, covering introductory to advanced concepts. The presentation will address simulations of emission intensity through a blend of Judd-Ofelt theory [1,2], intramolecular energy transfer theory [3,4], and rate equations modeling [5]. By breaking down complex concepts into simplified explanations, such as electronic transition selection rules, attendees will gain a clear understanding of the underlying processes in lanthanide-based photoluminescence phenomena.

Moreover, the impact of temperature on energy transfer rates will also be addressed, exploring how temperature variations can alter the population dynamics of emitting levels and, consequently, the intensity of emitted light [6]. Through discussions and illustrative examples, the lecture aims to deliver basic knowledge to the audience for the accurate prediction of the luminescent properties of lanthanide compounds, enabling the application of these principles in their own research.

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