



Lunedì 17 novembre ore 14
Aula C, Dipartimento di Scienze Chimiche

Seminario

$Tb^{3+} \rightarrow Eu^{3+}$ energy transfer in $LnAl_3(BO)_4$ crystals

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The present talk focuses on energy transfer processes involving trivalent lanthanide ions (Ln^{3+}) in materials fully concentrated with respect to the Tb^{3+} ion (sensitizer) and containing relatively small amounts of the ion Eu^{3+} (activator). One class of inorganic crystal hosts will be considered, namely the trigonal huntite borates $LnAl_3(BO_3)_4$, which find applications in the field of luminescent materials and devices. The optical spectroscopy and the excited state dynamics as a function of the temperature of these materials will be presented, and the characteristics of the energy transfer process will be identified and discussed.

In all cases, the $Tb^{3+} \rightarrow Eu^{3+}$ transfer of excitation occurs in the presence of fast energy migration among the Tb^{3+} donor ions, making the overall process highly efficient. By progressively increasing the Eu^{3+} concentration, it is possible to obtain, upon excitation in the near UV, visible light emission that is finely tuneable from the green to the orange, and finally to the red spectral region, without significant overall quenching [1]. This tunability can be widely applied in display technologies. The materials considered in this study have also potential in the field of remote thermometry,

[1] L. Ceccon et al., *Ceramics International*, 51 (2025) 16471-16474.

Prof.ssa Silvia Gross
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Il Direttore del Dipartimento
Prof. Stefano Mammi