d-d and f-f absorption bands

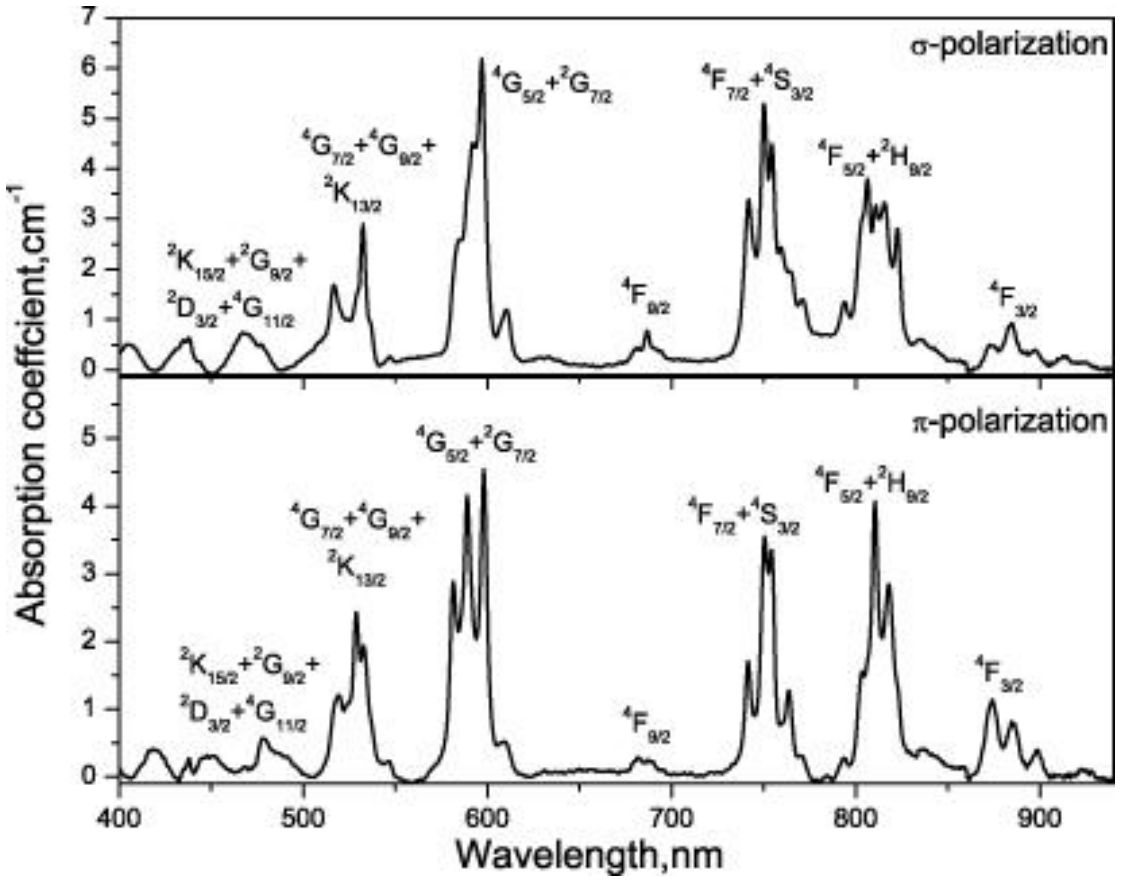
Metal ions

Assays

Matrix solutions

Neodymium spectroscopy: forbidden f-f transitions

The ground state electron configuration of Nd is [Xe]$4f^4 6s^2$. However, Nd(III) has a configuration [Xe]$4f^3$. Nd transitions observed in the absorption spectrum start from the $^4I_{9/2}$ ground state. Transitions to the following $^2S+^1L_J$ levels can be observed: $^4F_{3/2}$, $^2H_{9/2}$, $^4F_{5/2}$, $^4F_{7/2}$, $^4S_{3/2}$, $^4F_{9/2}$, $^2H_{11/2}$, $^4G_{5/2}$, $^2G_{7/2}$, $^4G_{7/2}$, $^4K_{13/2}$, $^4G_{9/2}4$, $^2K_{15/2}$, $^4G_{11/2}$, $^2D_{3/2}$ and $^2G_{9/2}$. The spectrum shown is a high resolution spectrum of Nd-doped $LaTiO_3$.



Copper sulfate spectroscopy: forbidden d-d transitions

The ground state electron configuration of Cu is [Ar]$3d^{10}4s^{1}$. However, Cu(II) has a configuration [Ar]$3d^{9}$. In the hexahydrate there is an octahedral ligand field. It is an

Unusual case because the water molecules all have the same Cu-O bond length.

There is no measurable Jahn-Teller distortion.

The electronic transition is LaPorte forbidden.

d-d transitions are broad.