

On the long decay time of the 7F_5 level of Tb^{3+} .

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Streszczenie

The $Tb^{3+} {}^7F_5$ level has been shown to play an important role in the energy transfer involving this ion. This is due to the unusually long lifetime of this level which is commonly disregarded when treating energy transfer involving this ion. In this work, we give a rationalized explanation for this phenomenon. It is discussed that the 7F_5 level can be fed by an energy transfer process and the population is trapped due to a low decay rate, which is related to the energy gap to the 7F_6 ground level in the far infrared and the correspondingly low photon density of states. This is in agreement with experimental data from direct measurements of the total decay lifetimes of the 7F_5 level and the emission quantum yields when this level is considered as an energy acceptor in Tb^{3+} compounds.

Słowa kluczowe

Trivalent terbium, Multiphonon rate, Radiative rate, $Tb^{3+} {}^7F_5$ level, Population fraction

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