

$4f^6 \rightarrow 4f^5d^1$ absorption spectrum analysis of $\text{Sm}^{2+}:\text{SrCl}_2$.

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Rok wydania

2007

Czasopismo

Physical Review B

Numer woluminu

76

Strony

1-9

DOI

10.1103/PhysRevB.76.115125

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

The $4f^6 \rightarrow 4f^5d^1$ absorption spectrum of the Sm^{2+} ions incorporated in a SrCl_2 single crystal was recorded at 4.2 K in the 15 000–45 000 cm^{-1} spectral range. The overall spectrum is very satisfactorily simulated by theoretical calculations performed in the frame of the semi-empirical Hamiltonian model. The calculations enabled the assignment of all bands observed in the spectrum as well as a prediction of some experimentally unobserved transitions in the 45 000–55 000 cm^{-1} region. The rich vibronic structure observed for absorption bands in the 15 000–25 000 cm^{-1} spectral region is dominated by the vibronic progressions in the totally symmetric Sr-Cl stretching mode of $\sim 213 \text{ cm}^{-1}$ upon the thirteen zero phonon lines and local vibration modes at $\sim 81 \text{ cm}^{-1}$ and $\sim 116 \text{ cm}^{-1}$. This multiphonon vibronic spectrum is very well reproduced by the model calculation.

Adres publiczny

<https://doi.org/10.1103/PhysRevB.76.115125>