Spectrum analysis, correlation crystal-field effects and *f* - *f* transition intensities of U^{3+} in $LaCl_3$.

Autorzy

Mirosław Karbowiak

Janusz Drożdżyński

Marcin Sobczyk

Rok wydania

2002

Czasopismo

Journal of Chemical Physics

Numer woluminu

117

Strony

2800-2808

DOI

10.1063/1.1482372

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

High resolution polarized absorption spectra of U31: LaCl3single crystals were recorded in the4000– 50 000 cm21range at 7 K. The experimental crystal-field energy levels of the U31ion werefitted to a semiempirical Hamiltonian employing free-ion, one-electron crystal-field as well astwo-particle correlation crystal-field~CCF!operators. The performed analysis of the spectra enabledthe determination of crystal-field parameters and reassignment of some of the observed 5f3!5f3transitions. The effects of selected CCF operators on the splitting of some specific U31multiplets have been investigated. On the basis of the obtained electronic wave functions theelectric-dipole intensity parameters of the total transition dipole strength were determined by fittingthe calculated and experimental transition intensities. Among 67 transitions observed in the4000– 22 000 cm21range 56 were sufficiently well resolved for quantitative calculations.

Adres publiczny

https://doi.org/10.1063/1.1482372

Strona internetowa wydawcy

https://www.aip.org/