

Extension of high-resolution optical absorption spectroscopy to divalent neodymium : absorption spectra of Nd²⁺ ions in a SrCl₂ host.

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Streszczenie

There is a lack of information on electronic spectra of divalent neodymium, and thus the synthesis and characterization of Nd²⁺ systems is now reported. Stabilization of neodymium is observed in a chloride host, which importantly has been accomplished with Nd ions introduced in a divalent state during synthesis, unlike by γ -irradiation of Nd³⁺ system employed previously. This method yields good-quality SrCl₂:Nd²⁺ single crystals. For the first time the electronic absorption spectra of Nd²⁺ doped in SrCl₂ have been recorded with high resolution at liquid helium temperature (4.2 K). Identification of the absorption bands occurring in the spectral range of 5000-40 000 cm⁻¹ (2000-250 nm) has been achieved and their tentative assignment proposed. This uniquely detailed Nd²⁺ absorption spectrum provides basis for fingerprinting method enabling identification of the presence of Nd²⁺ ions in future spectra as well as in existing but as-yet not fully resolved spectra.

Słowa kluczowe

absorption spectroscopy, f-d transitions, neodymium, strontium

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