

Spectroscopic peculiarities of CsCaI₃:Tm²⁺ single crystals examined through one-photon and excited state excitation spectroscopy.

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Rok wydania

2018

Czasopismo

Journal of Alloys and
Compounds

Numer woluminu

740

Strony

1165-1171

DOI

10.1016/j.jallcom.2018.01.058

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

The CsCaI₃ single crystals doped with Tm²⁺ were grown by Bridgman technique. Divalent thulium luminescence related to the 4f¹³-4f¹³ intra-configurational and 4f¹²5d¹-4f¹³ inter-configurational transitions were analyzed as a function of temperature. Excited state excitation spectroscopy has been applied within a wide spectral range to examine peculiarities of transitions between different 4f¹²5d¹ excited states of Tm²⁺. This two-color excitation experiment was useful to assess d-d photon-absorption processes that are relevant to observed up-conversion phenomena attributed to effective anti-Stokes green luminescence around 550 nm. Furthermore, activation energy of 4f¹²5d¹ → 4f¹³ luminescence quenching was estimated and high value of ²F_{5/2} → ²F_{7/2} emission cross-section was determined in CsCaI₃:Tm²⁺. Our spectroscopic study was performed to complement and verify the previous investigation in this field.

Słowa kluczowe

Rare earth alloys and compounds, Optical absorption spectroscopy, Divalent thulium, CsCaI₃, Excited state excitation

Adres publiczny

<http://dx.doi.org/10.1016/j.jallcom.2018.01.058>

Strona internetowa wydawcy

<http://www.elsevier.com>