

Nd³⁺ Ion as a Structural Probe in Studies of Selected Oxide Host Lattices: Coupling the Low-Temperature High-Resolution Spectroscopic Techniques with Microscopy

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In this paper we present the relationships between structural and spectroscopic investigations of neodymium ion dopant (Nd³⁺) in selected oxide host lattices with particular highlighting its role as a structural probe. The main goal is to get precious information about the symmetry and activator's environment in the following different oxide host lattices like cubic Lu₂O₃ sesquioxide and molybdate compounds of tetragonal scheelite-type CdMoO₄, monoclinic/cubic La₂Mo₂O₉ (LAMO) as well as cubic Y₆MoO₁₂, we met during research of new transparent ceramics. This choice gives us the opportunity to point out the usefulness of two techniques: the low-temperature high-resolution techniques applied to the ⁴I_{9/2} → ²P_{1/2} (around 432 nm) and ⁴I_{9/2} → ⁴F_{3/2} (around 875 nm) absorption transitions at 4.2 K and site-selective tuneable laser spectroscopy with OPO and Ti:Sapphire laser sources, applied to the ⁴F_{3/2} → ⁴I_{9/2} (around 900 nm) and ⁴F_{3/2} → ⁴I_{11/2} (around 1064 nm) emission transitions at 77 K. We hope that the results presented at the School will help the students to know how important is the role played by Nd³⁺ dopant not only as laser ion in near the infrared spectral region but also as structural probe for host lattices.

Słowa kluczowe

Nd³⁺ ion, Oxide host lattices, Transparent ceramics, Structural probe, Optical materials

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