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Orthorombic Yb:Li2Zn2(MoO4)3- A novel potential crystal for broadly tunable lasers

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Abstract

© 2017 Astro Ltd. Crystal with composition Li 2 Zn 2 (MoO 4) 3 doped with 0.7 at.% Yb (Yb:LiZnMo), with high optical quality and a length of a few cm is grown from the flux using Li 2 MoO 4 as a solvent. Yb:LiZnMo is orthorombic (sp. gr. Pnma, a = 5.0843 Å, b = 10.4927 Å, c = 17.6742 Å, Z = 4). Polarized Raman spectra are studied for this crystal; the most intense band is observed at 898 cm -1 . The absorption, stimulated-emission and gain cross-sections of Yb 3+ ions are determined for the principal light polarizations, E || a, b, c. The maximum σ SE = 6.6 × 10 -21 cm 2 at 1011 nm for E || b. The gain bandwidth for Yb:LiZnMo is up to ~50 nm. The radiative lifetime of the Yb 3+ ions is 1.55 ms. The Yb:LiZnMo crystals are very promising for broadly tunable lasers.

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Keywords

laser materials, molybdate crystals, Raman spectra, stimulated-emission, ytterbium

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