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Energy transfer in Tm,Ho:KYW crystal and diode-pumped microchip laser operation

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Abstract

© 2016 Optical Society of America. An investigation of Tm-Ho energy transfer in Tm(5at.),Ho(0.4at.):KYW single crystal by two independent techniques was performed. Based on fluorescence dynamics measurements, energy transfer parameters P71 and P28 for direct (Tm→Ho) and back (Ho→Tm) transfers, respectively, as well as equilibrium constant Θ were evaluated. The obtained results were supported by calculation of microscopic interaction parameters according to the Förster-Dexter theory for a dipole-dipole interaction. Diode-pumped continuous-wave operation of Tm,Ho:KYW microchip laser was demonstrated, for the first time to our knowledge. Maximum output power of 77 mW at 2070 nm was achieved at the fundamental TEM₀₀ mode.

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