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Manganese (II) Coordination Polymer as a Nonlinear Saturable Absorber for Mode-Locking at 1-micron

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Abstract

A passive mode-locked laser was demonstrated using an all-fibre ytterbium-doped fibre laser. Mode-locking was generated using a manganese (Mn (II)) material as a saturable absorber (SA) in a ring-cavity ytterbium-doped fibre laser. The Mn (II)-SA, fabricated via the hydrothermal method, using trans-1-(2-pyridyl)-2-(4-pyridyl)ethylene linker and manganese(II) chloride tetrahydrate ($\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$). The solution was then deposited onto a side-polished fibre, which exhibits a modulation depth of 18.1%, a saturation intensity of 0.74 MW/cm², and a nonsaturable loss of 55.03%. The ring cavity outputs dissipative soliton mode-locked at 1030 nm, with a pulse duration of 9.1 ps and a repetition rate of 20.7 MHz. © 1965-2012 IEEE.

Author keywords

Dissipative soliton; metal-based coordination polymer; nonlinear optical materials; ytterbium-doped fibre laser

Indexed keywords

Engineering controlled terms

Chlorine compounds; Ethylene; Fiber lasers; Fibers; Locks (fasteners); Manganese compounds; Mode-locked fiber lasers; Nonlinear optics; Optical materials; Passive mode locking; Saturable absorbers; Solitons; Ytterbium

Engineering uncontrolled terms

Coordination Polymers; Coordination-polymers; Dissipative solitons; Metal-based coordination polymer; Modelocking; Nonlinear optical materials; Passive mode-locked; Pyridyl; Ring cavities; Ytterbium-doped fiber lasers

Engineering main heading

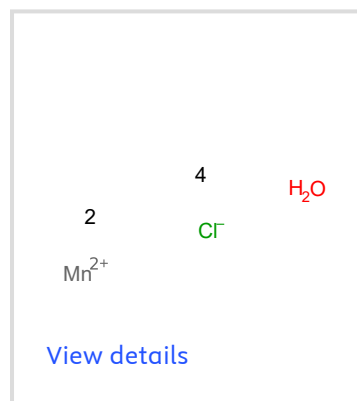
Pulse repetition rate

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Details about financial support for research, including funding sources and grant numbers as provided in academic publications.

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