

Article outline

Abstract

Keywords

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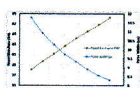
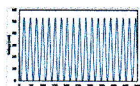
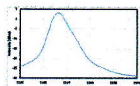
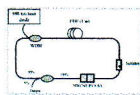
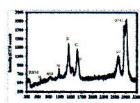
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Acknowledgement

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Figures and tables

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Passively Q-switched fiber lasers using a multi-walled carbon
nanotube polymer composite based saturable absorberS.M. Azooz^{a, b}, M.H.M. Ahmed^{a, b}, F. Ahmad^{a, b}, B.A. Hamida^c, S. Khan^c, H. Ahmad^b, S.W. Harun^b[Show more](#)

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Abstract

We demonstrate a simple, compact and low cost Q-switched fiber lasers based on Erbium-doped fiber (EDF) and Thulium-doped fiber (TDF) to operate at 1534.5 nm and 1846.4 nm, respectively by exploiting a multi-walled carbon nanotubes (MWCNTs) polymer composite film based saturable absorber (SA). The composite is prepared by mixing the MWCNTs homogeneous solution into a dilute polyvinyl alcohol polymer solution before it is left to dry at room temperature to produce thin film. Then the film is sandwiched between two FC/PC fiber connectors and integrated into the laser cavity for Q-switching pulse generation. The EDF laser generates a stable pulse train with repetition rates ranging from 38.11 kHz to 48.22 kHz by varying the 980 nm pump power from 39.0 mW to 65.3 mW. At the 65.3 mW pump power, the pulse width and pulse energy were 5.3 μ s and 99.75 nJ, respectively. The TDF laser generates a stable pulse train with 10.38 kHz repetition rate, 17.52 μ s pulse width and 11.34 nJ pulse energy at 121.1 mW 800 nm pump power. A higher performance Q switching is expected to be achieved in both fiber lasers with the optimization of the SA and laser cavity.

Keywords

Multi-walled carbon nanotubes; Q-switching; Passive saturable absorber

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42.60.Da (Resonators; cavities; amplifiers; arrays; and rings); 42.55.Wd (Fiber Lasers); 42.65.Re (Ultrafast processes; optical pulse generation and pulse compression); 42.60.Gd (Q-switching)

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