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Title: Multi-wavelength Q-switched Erbium-doped fiber laser with photonic crystal fiber and multi-walled carbon nanotubes

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Abstract: A simple multi-wavelength passively Q-switched Erbium-doped fiber laser (EDFL) is demonstrated using low-cost multi-walled carbon nanotubes (MWCNTs)-based saturable absorber, which is prepared using polyvinyl alcohol as a host polymer. The multi-wavelength operation is achieved based on non-linear polarization rotation effect by incorporating 50 m long photonic crystal fiber in the ring cavity. The EDFL produces a stable multi-wavelength comb spectrum for more than 14 lines with a fixed spacing of 0.48 nm. The laser also demonstrates a stable pulse train with the repetition rate increasing from 14.9 to 25.4 kHz as the pump power increases from the threshold power of 69.0 mW to the maximum pump power of 133.8 mW. The minimum pulse width of 4.4 μs was obtained at the maximum pump power of 133.8 mW while the highest energy of 0.74 nJ was obtained at the pump power of 69.0 mW.

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