Dissipative soliton mode-locked erbium-doped fiber laser using Nb2AlC nanomaterial saturable absorber

ABSTRACT

We report the fabrication of an erbium-doped fiber-based saturable absorber (SA) of niobium aluminium carbide (Nb2AlC) nanomaterial that can generate a dissipative soliton mode locked pulse. Stable mode-locked pulses operating at 1530 nm with repetition rates of 1 MHz and pulse widths of 6.375 ps were produced using polyvinyl alcohol (PVA) and the Nb2AlC nanomaterial. A peak pulse energy of 7.43 nJ was measured at 175.87 mW pump power. In addition to providing some useful design suggestions for manufacturing SAs based on MAX phase materials, this work shows the MAX phase materials' immense potential for making ultra-short laser pulses.