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Mode-locking in holmium doped fiber laser operating at 2.06 μm using manganese violet

[Are you this author?](#)**By** Ahmad, H; Kamaruzzaman, K; Zulkifli, MZ**Source** OPTICAL AND QUANTUM ELECTRONICS

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Abstract In this letter, we demonstrated mode-locking in a holmium-doped fiber laser (HDFL) using manganese violet (MV) drop-casted on an arc-shaped fiber as the saturable absorber (SA). The MV solution was prepared using the hydrothermal method. The HDFL was pumped with a compact in-house thulium-doped fiber laser operating at 1943 nm, delivering a continuous wave (CW) output of up to 2 W. Mode-locking was successfully generated at the pump power of 1.2 W by integrating the MV-SA into the ring cavity. The pulses obtained were centered at a wavelength of 2067.4 nm, with a repetition rate of 4.41 MHz and a pulse duration of 3.05 ps. The 16 signal-to-noise ratio (SNR) measured was 42.1 dB. This work is th

first to use a material-based SA on an arc-shaped fiber to generate mode-locking in an HDFL. It will hopefully spur further research on exploring other two-dimensional (2D) materials to generate short pulses at the longer wavelength near 2.1 μm .

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