

Ultrafast Nonlinear Optical Properties of MTe_2 ($M = V$ and Ta) and Their Application as Broadband Saturable Absorbers

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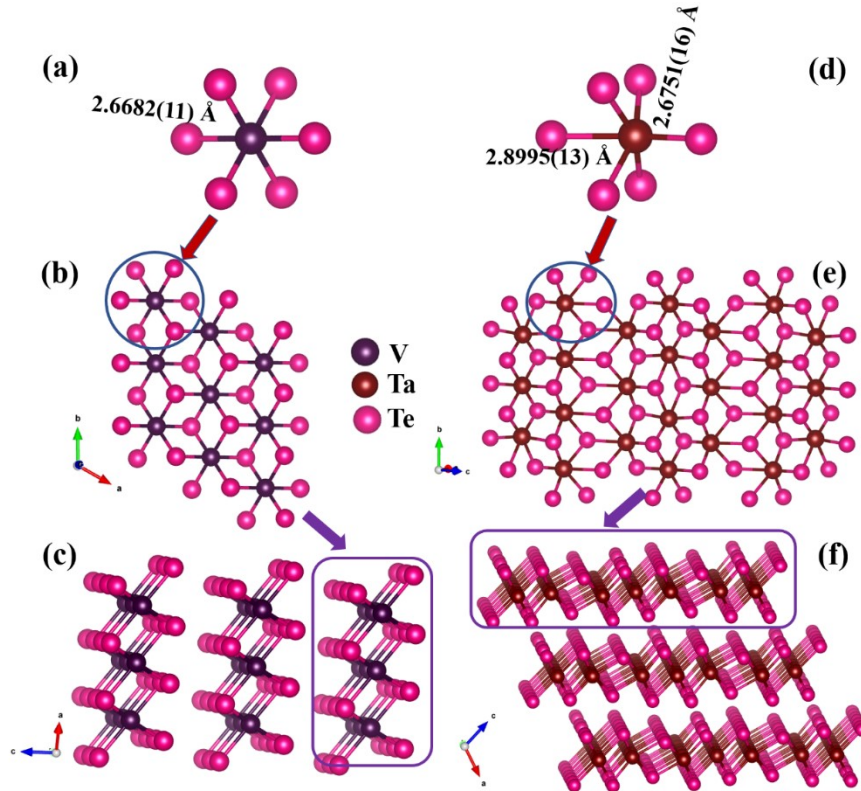


Fig. S1 Crystal structures of $M\text{Te}_2$ ($M = \text{V}$ and Ta). (a)-(c) the VTe_6 octahedron, $[\text{VTe}]$ layer, stacked $[\text{VTe}]$ layers along the c direction. (d)-(f) the TaTe_6 octahedron, $[\text{TaTe}]$ layer, stacked $[\text{TaTe}]$ layers along the a direction.

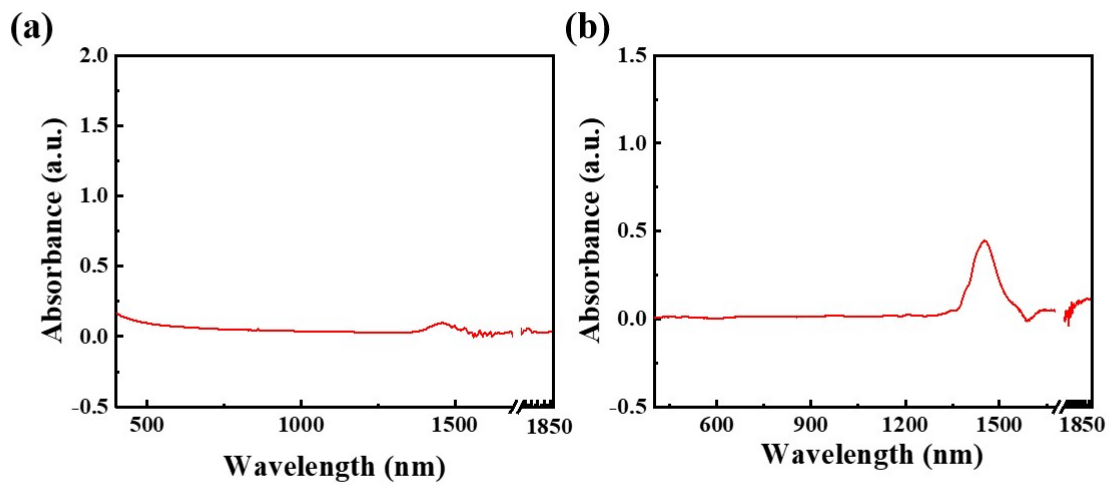


Fig. S2 Measured linear absorption spectra of (a) VTe₂ and (b) TaTe₂.

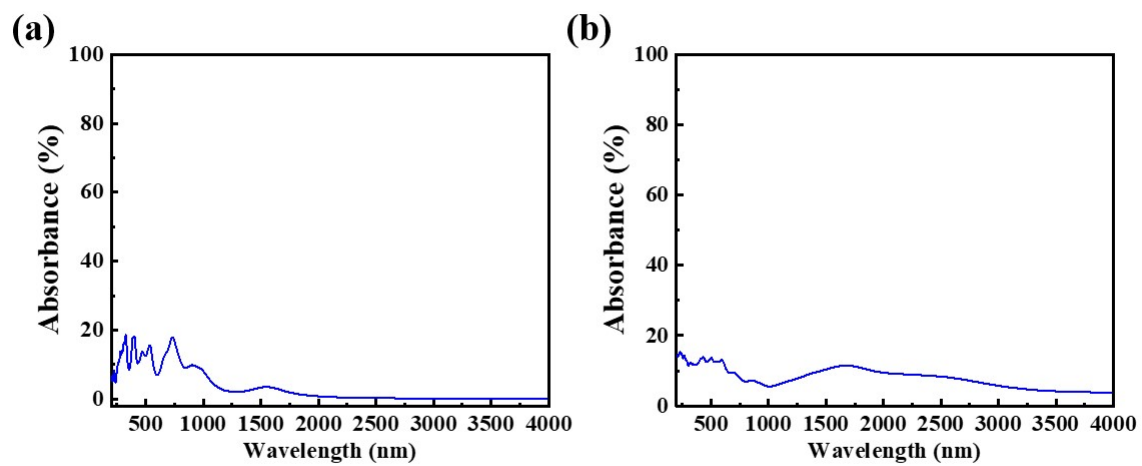


Fig. S3 Calculated absorption spectra of monolayer (a) VTe₂ and (b) TaTe₂.

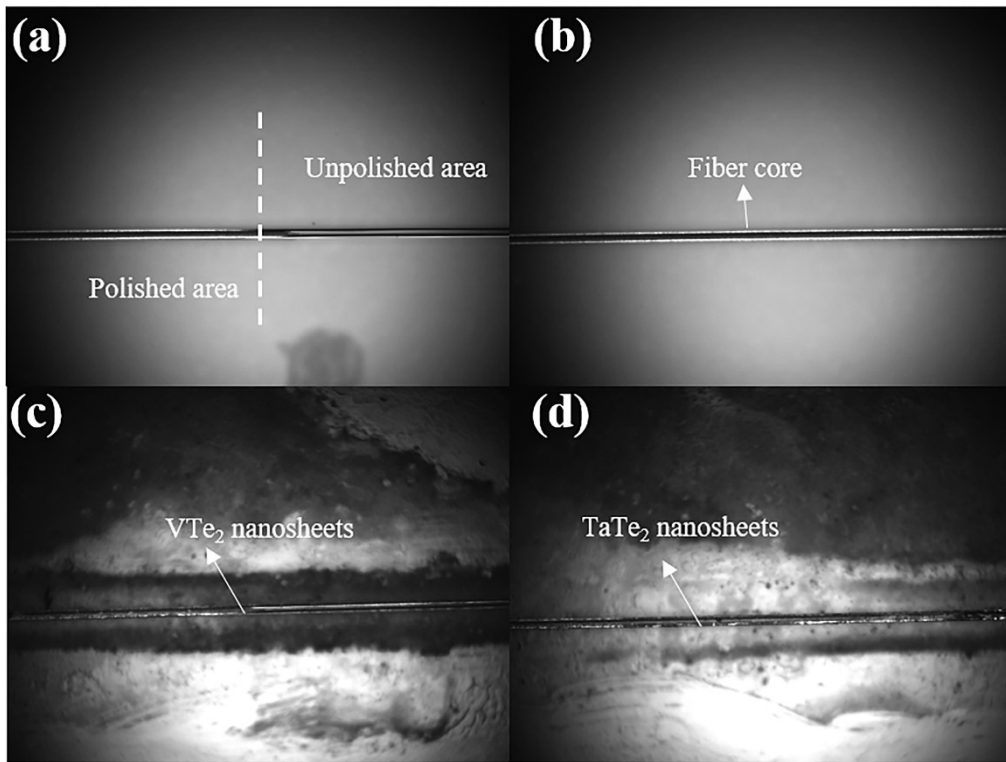


Fig. S4 (a and b) images of the D-shaped fiber without material deposition, (c and d) images of the D-shaped fiber with material deposition as SA devices.

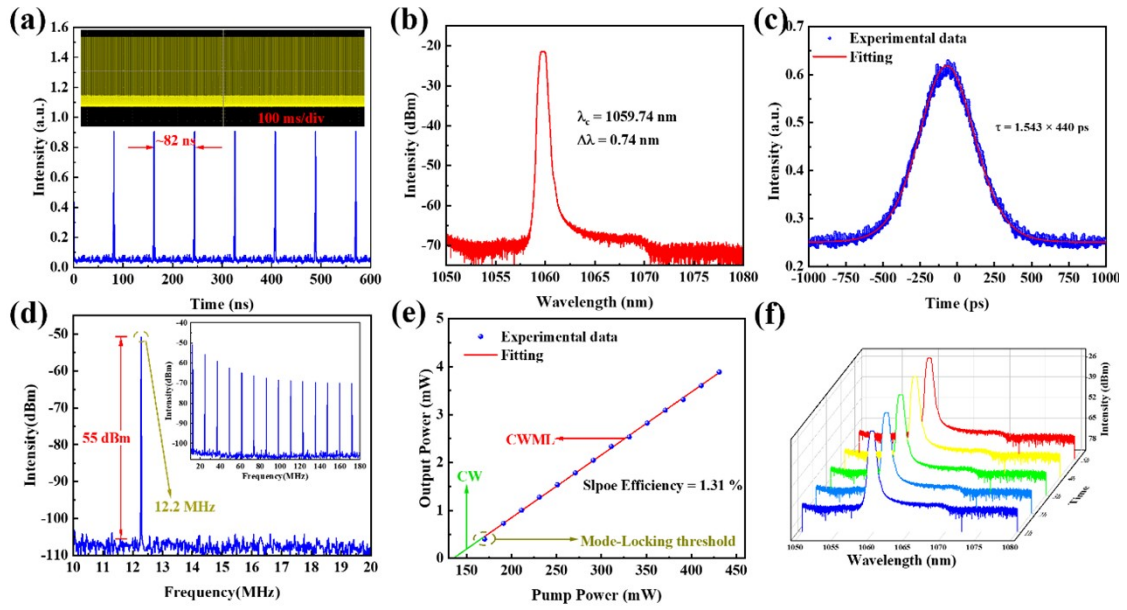


Fig. S5 Typical mode-locked pulse characteristics. (a) Pulse train; (b) Optical spectrum; (c) Measurement of the laser pulse width; (d) Radio frequency spectrum (inset: the wideband RF spectrum) of the mode-locked pulses; (e) Variation in the output power with respect to the pump power; (f) Optical spectral measurements at 1 h intervals over 5 h.

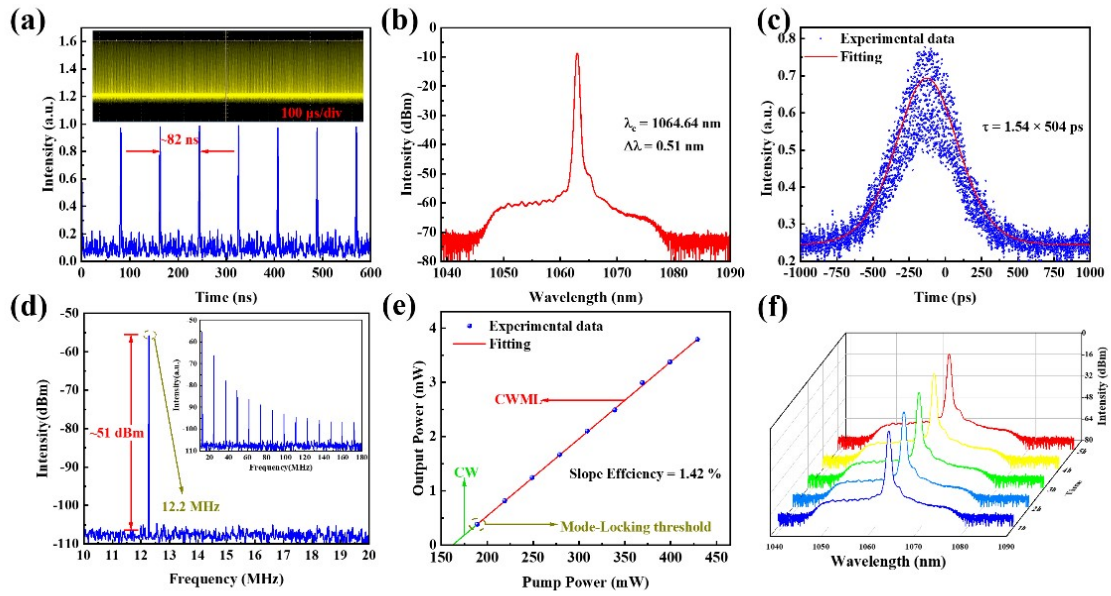


Fig. S6 Typical mode-locked pulse characteristics. (a) Pulse train; (b) Optical spectrum; (c) Measurement of the laser pulse width; (d) Radio frequency spectrum (inset: the wideband RF spectrum) of the mode-locked pulses; (e) Variation in the output power with respect to the pump power; (f) Optical spectral measurements at 1 h intervals over 5 h.

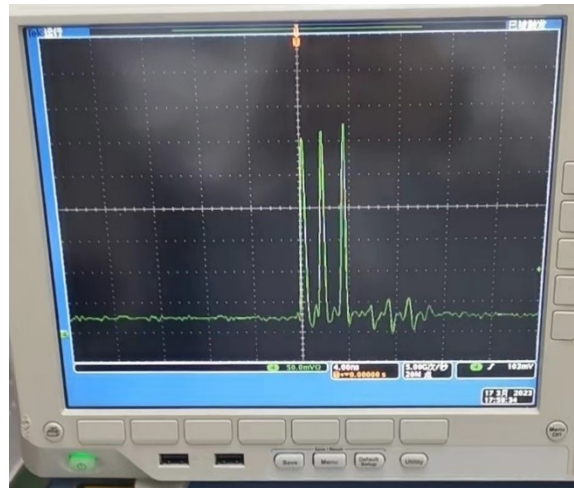


Fig. S7 Multi-soliton pulses appeared when the pump power increases.