Tailoring the ultrafast and nonlinear photonics of MXenes through elemental replacement

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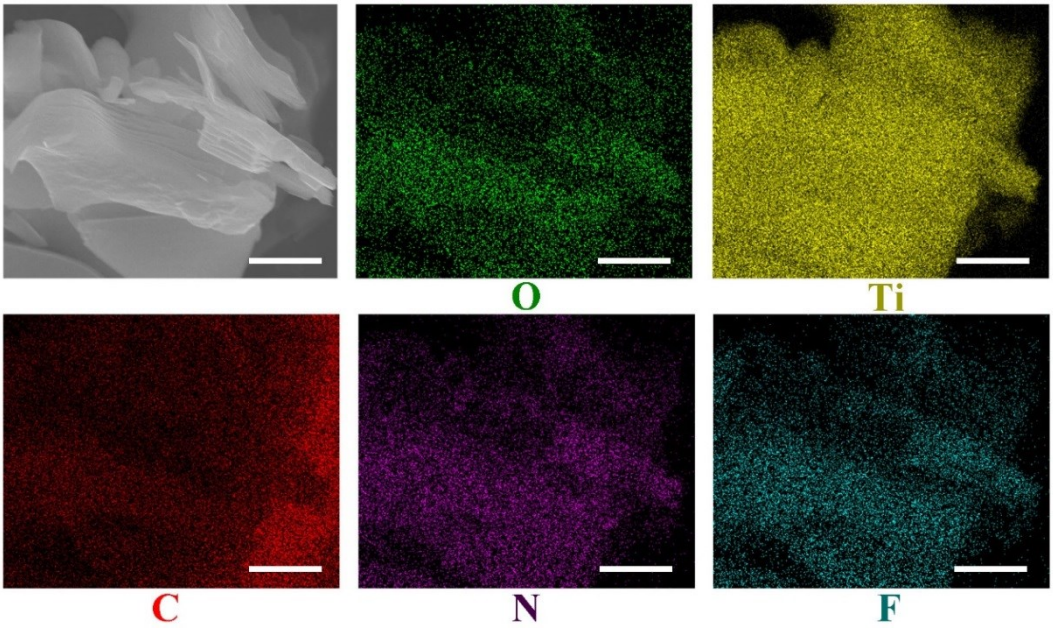

Figure S1. The EDS mapping of multi-layer Ti_3CN. Bar is 2.5 μm.

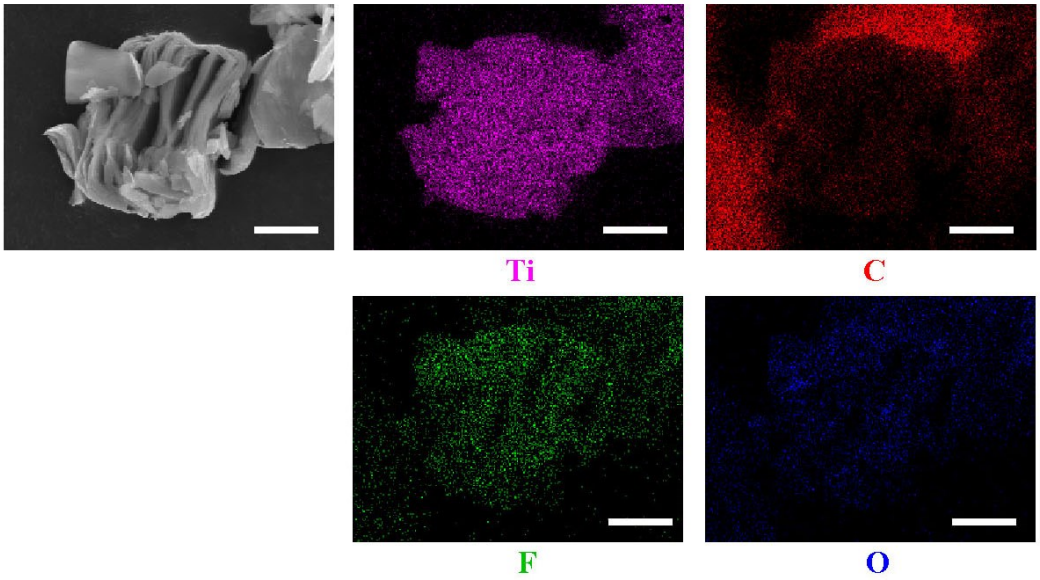

Figure S2. The EDS mapping of multi-layer Ti_3C_2. Bar is 5 μm.

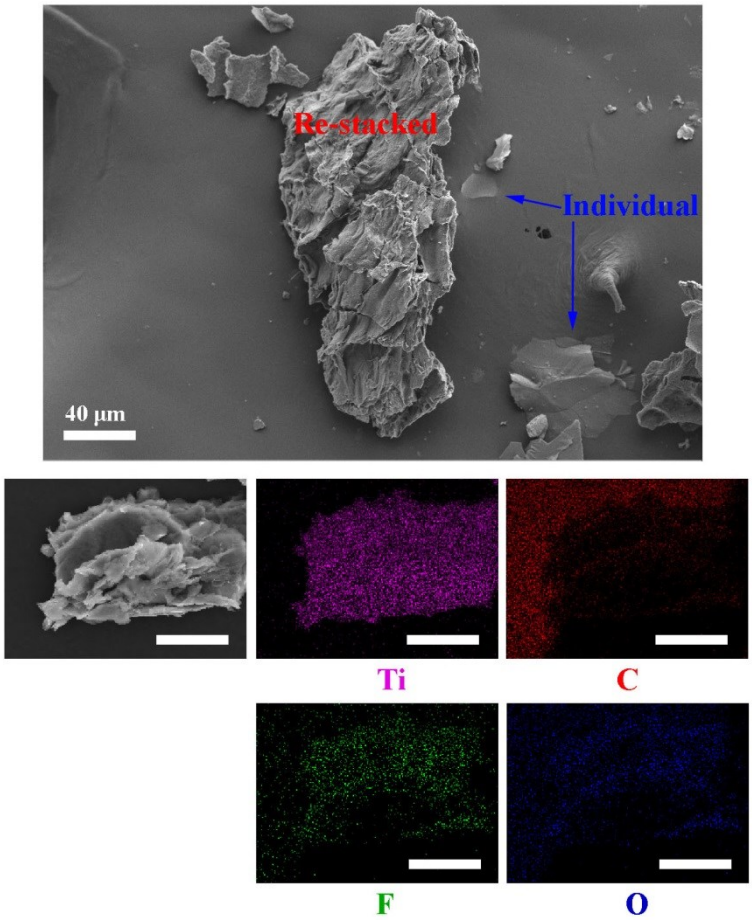

Figure S3. SEM image of delaminated Ti_3C_2 flakes and the corresponding EDS mapping image. Bar is 10 μm.

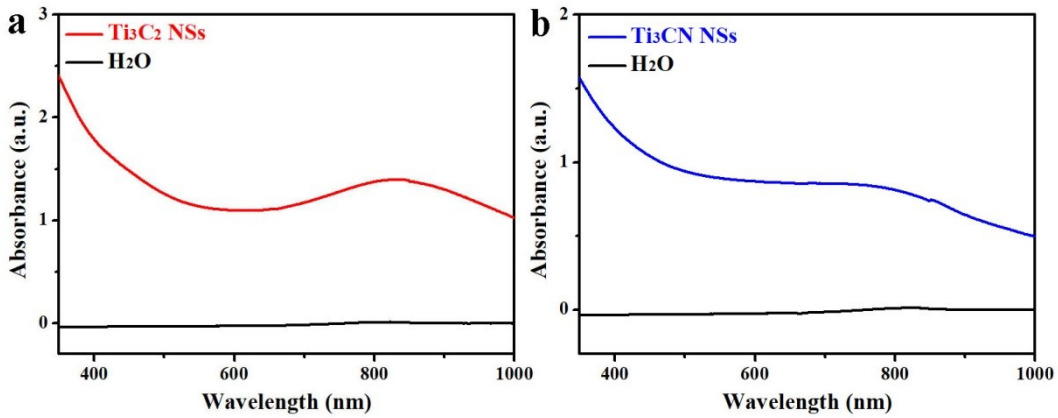

Figure S4. UV-Vis spectra of few-layer Ti_3C_2 (a) and Ti_3CN (b) NSs in water.

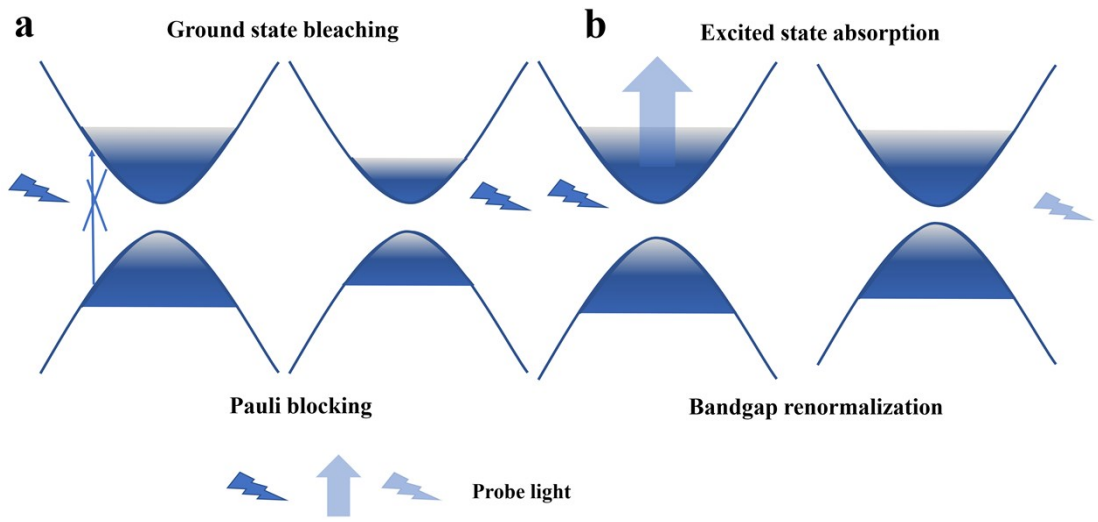

Figure S5. The schematic illustration of ground state bleaching and excited state absorption.

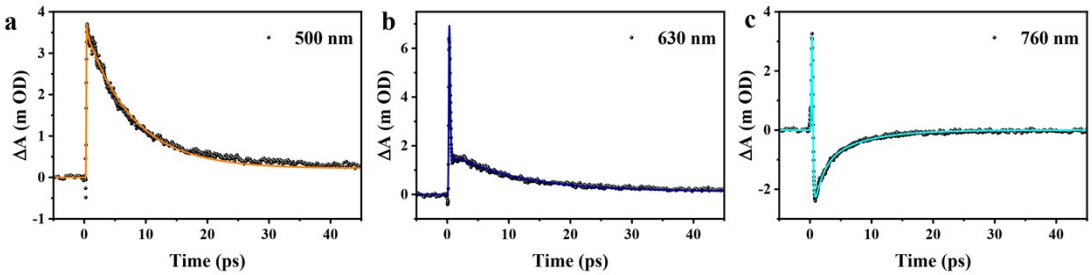

Figure S6. Dynamic curves in MXene NSs. (a-c) The experimental data and fitted results of the Ti_3C_2 at 500 nm, 630 nm, 760 nm, respectively.

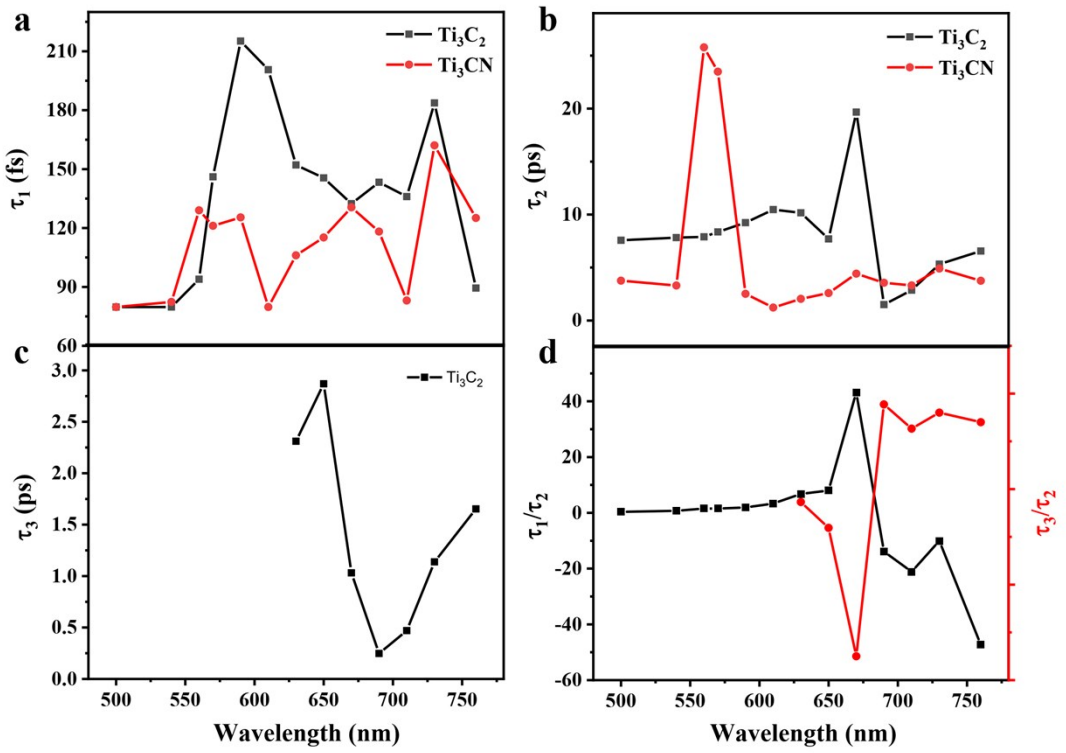

Figure S7. The summaries of fitted time constants at different probe wavelengths. (a) Carrier-carrier scattering time components, (b) carrier-phonon scattering time components of two MXenes, (c) BGR time components of Ti_3C_2 NSs, (d) the comparison of fitted time components in Ti_3C_2 NSs.

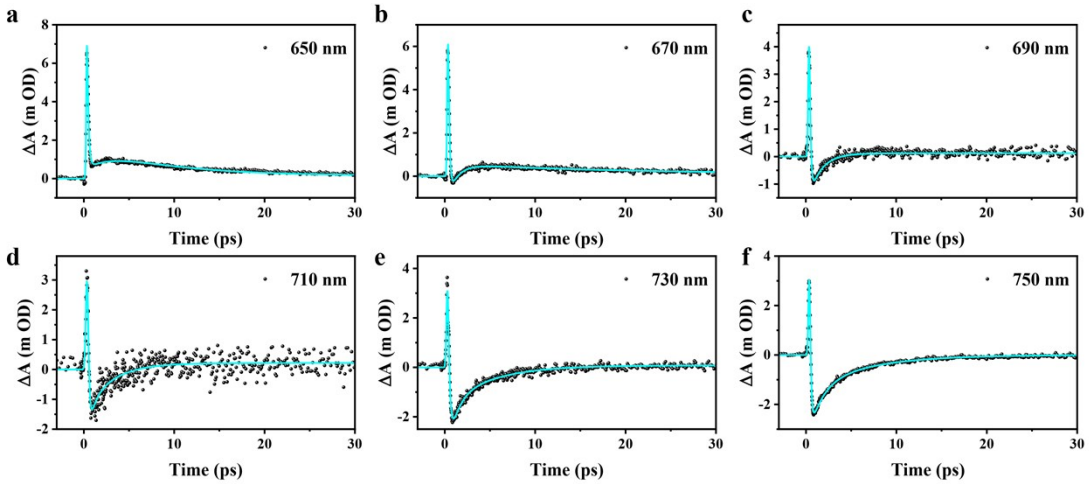

Figure S8. The BGR components dynamic curves in Ti_3C_2 NSs under different probe wavelengths of (a) 650 nm, (b) 670 nm, (c) 690 nm, (d) 710 nm, (e) 730 nm, and (f) 750 nm.

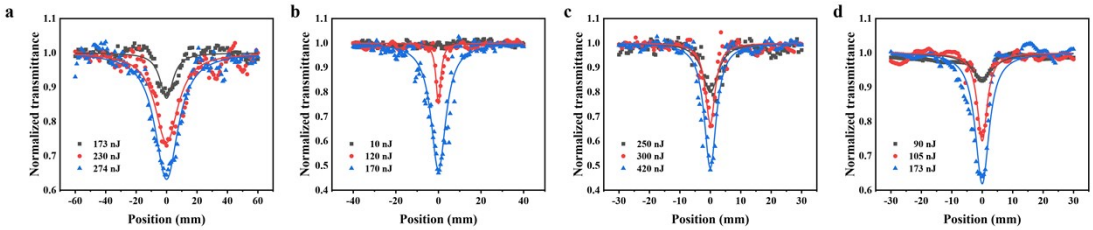

Figure S9. OA Z-scan traces and fitted curves of MXenes NSs. (a)-(d) NLO response of Ti_3C_2 NSs at 500 nm, 600 nm, 700 nm and 800 nm with different incident intensities.

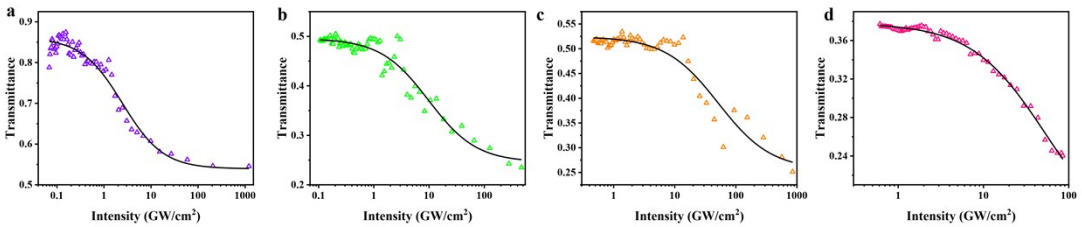

Figure S10. The nonlinear absorption characteristics of MXene NSs. (a)-(d) NLO response of Ti3CN NSs under various wavelengths with maximum incident single pulse energy.