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Supplementary Information for

Third-order optical nonlinearities of Nb_4C_3 MXene and its applications as an ultra-broadband mode-locker

Kyungtaek Lee[+], Suh-young Kwon[+], Jaehak Choi, Jeehwan Kim, Taeho Woo, Janghyun Ryu, Junha Jung and Ju Han Lee*

School of Electrical and Computer Engineering, University of Seoul, 163 Seoulsiripdae-ro, Dongdaemun-gu, Seoul 02504, Republic of Korea.

*Email: j.h.lee@ieee.org

[+] These two authors equally contribute to this work.

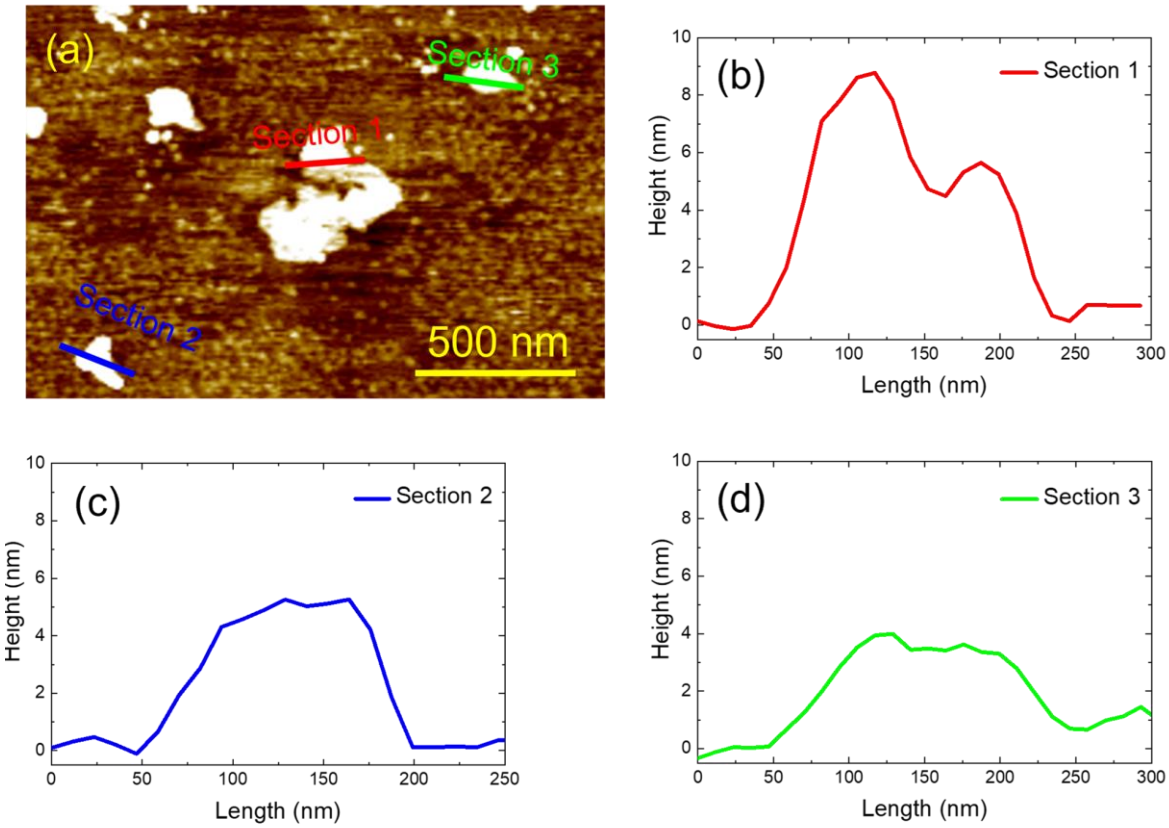

Fig. S1. (a) Measured AFM image of Nb_4C_3 MXene nanosheets. (b) Height profile of Nb_4C_3 Mxene of (a) Section 1, (b) Section 2, and (c) Section 3 in Figure S1a.

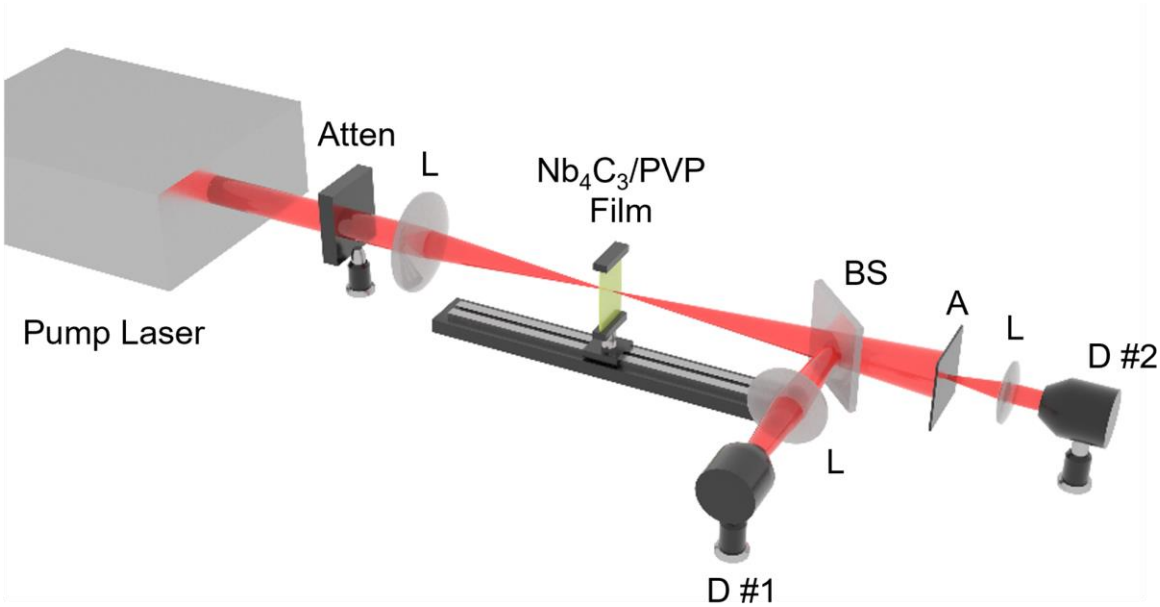

Fig. S2. Experimental schematic of simultaneous detection of OA and CA Z-scan measurement of Nb_4C_3 MXene nanosheets at 1560 and 1910 nm. Atten, L, BS, A, and D denote the attenuator, lens, beamsplitter, and detector.

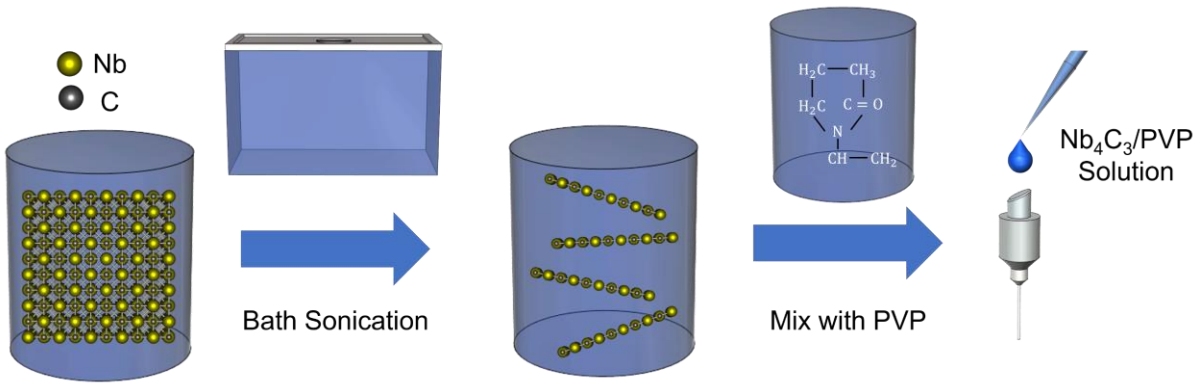

Fig. S3. A three-step procedure the fabrication of a MXene-based SA, including a LPE process of Nb_4C_3 MXene, a mixing process with PVP solution, and a deposition process

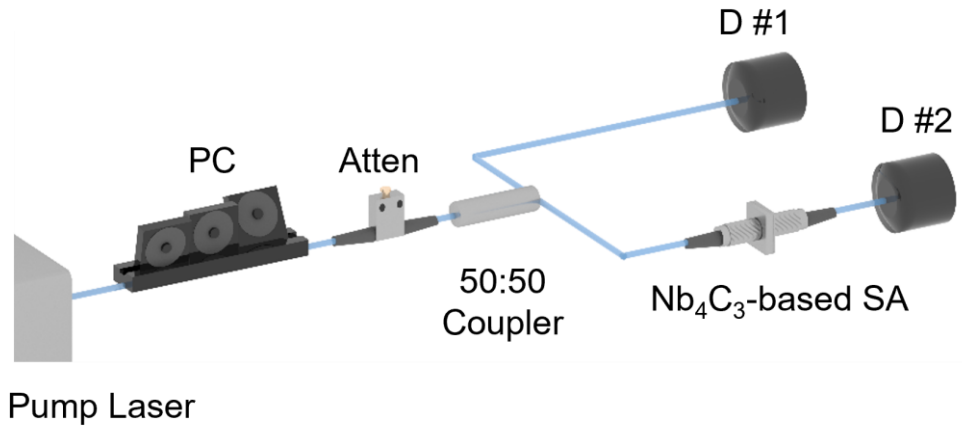

Fig. S4. Experimental schematic measuring nonlinear transmittance of Nb_4C_3 MXene nanosheet-based SA at 1560 and 1910 nm. PC, Atten, and D denote the polarization controller, attenuator, and detector.

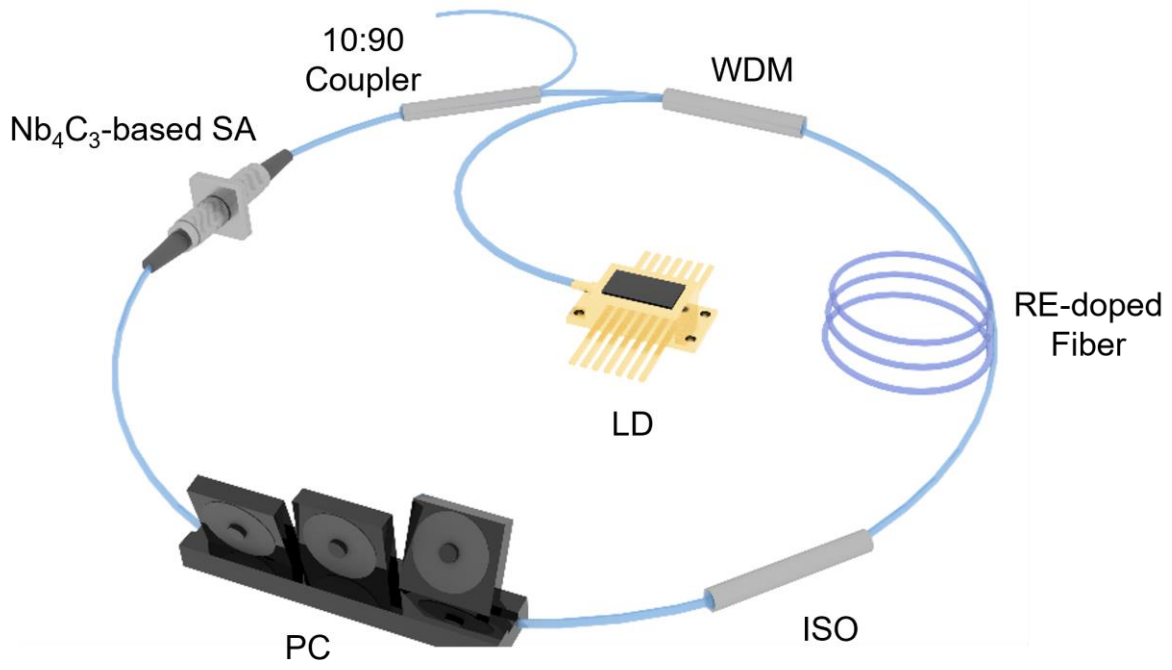

Fig. S5. Experimental schematic of Nb_4C_3 MXene nanosheet incorporated optical fiber ring cavity. LD, WDM, RE-doped fiber, ISO, and PC denotes laser diode, wavelength division multiplexer, rare-earth-doped fiber, isolator, and polarization controller.

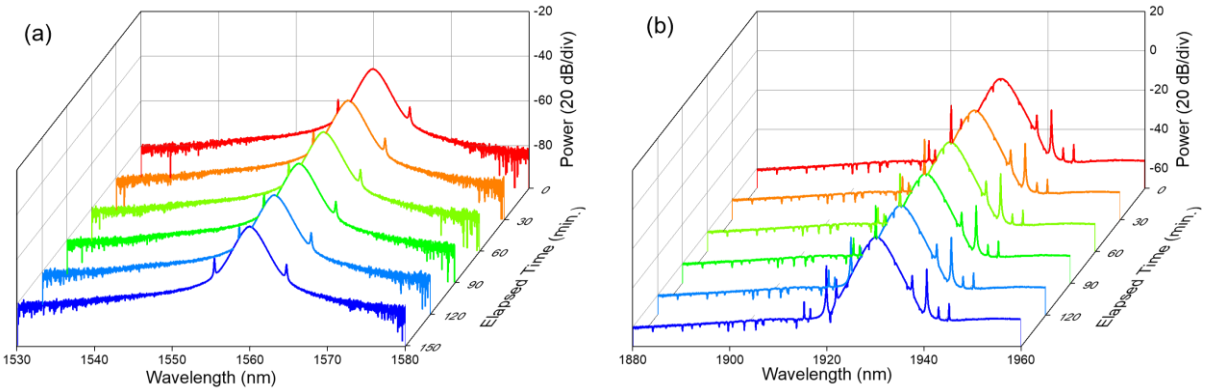

Fig. S6. The output optical spectrum measured at every 30 min. for 3 h at (a) 1560 nm and (b) 1930 nm.