

Supporting information

Two-Dimensional MXene Potentiates Therapeutic Microneedle Patch for Photonic Implantable Medicine in The Second NIR Biowindow

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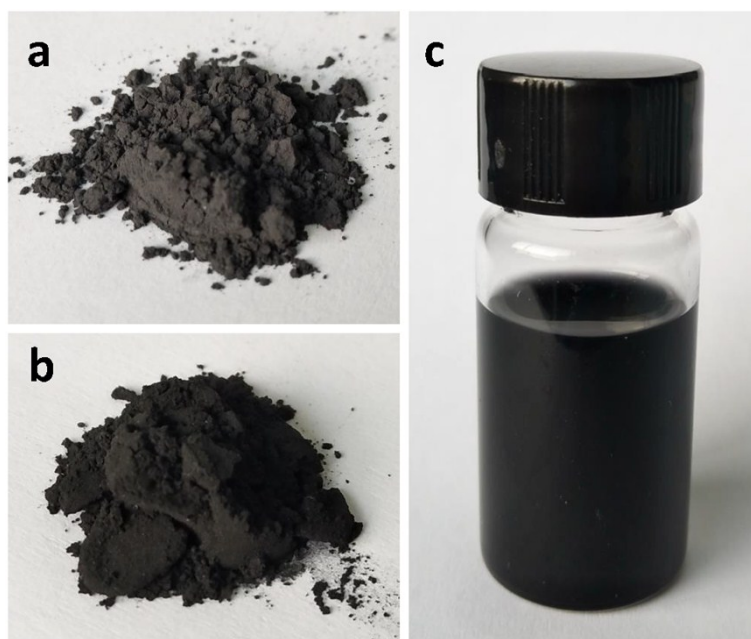


Fig. S1 Photographs of (a) Nb_2AlC ceramic bulk powder, (b) Nb_2C powder and (c) 2D Nb_2C MXene aqueous solution.

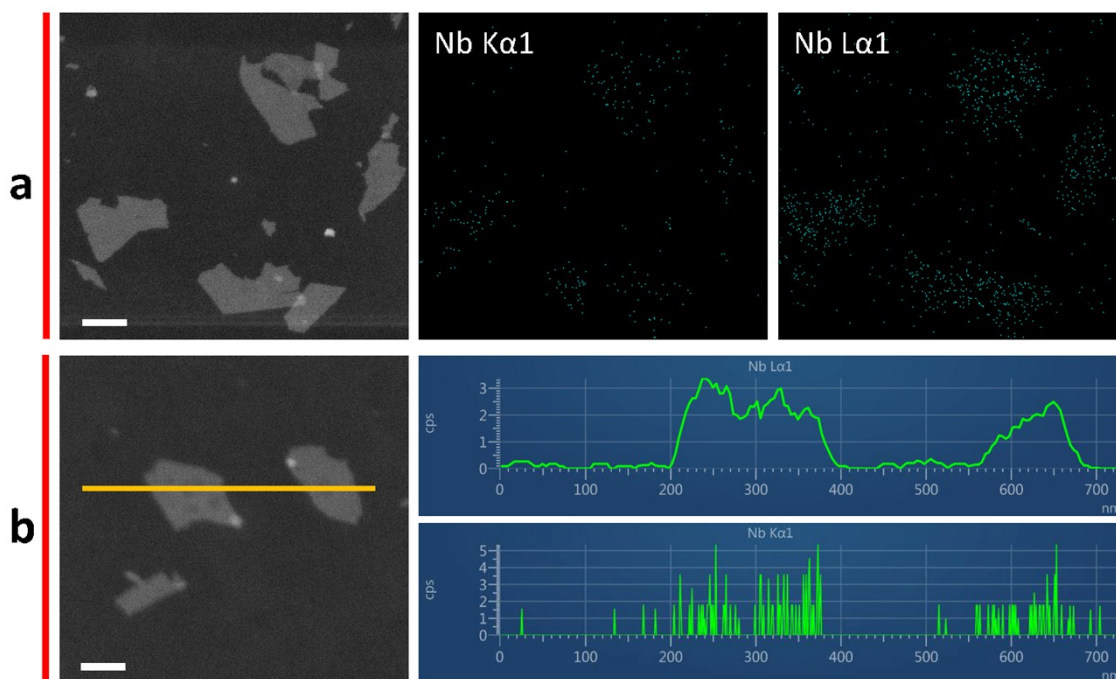


Fig. S2 EDS analysis of the formed 2D Nb₂C nanosheets. (a) Elemental mapping and (b) element-linear scanning of Nb. Scale bar: 100 nm.

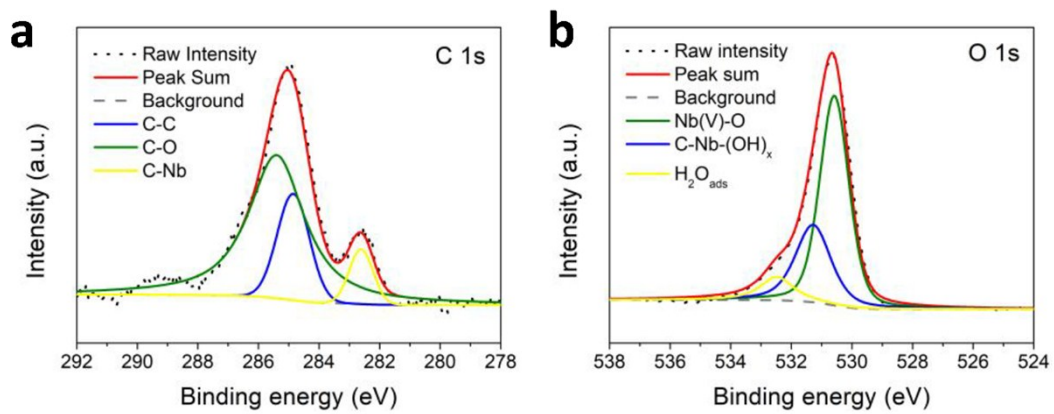


Fig. S3 XPS spectra of the formed Nb₂C in the region of (a) C 1s, (b) O 1s.

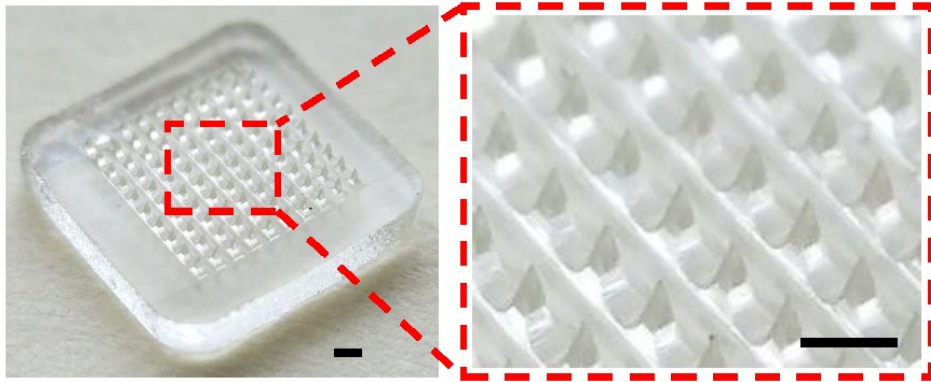


Fig. S4 Representative morphology of PVP-only MN's array. Scale bar: 500 μm .

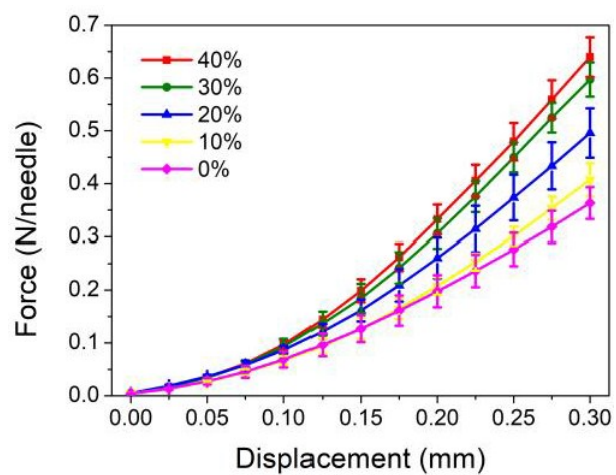


Fig. S5 Compressive strength of MNs with different Nb₂C contents (0%, 10%, 20%, 30%, and 40%)

(n = 3).

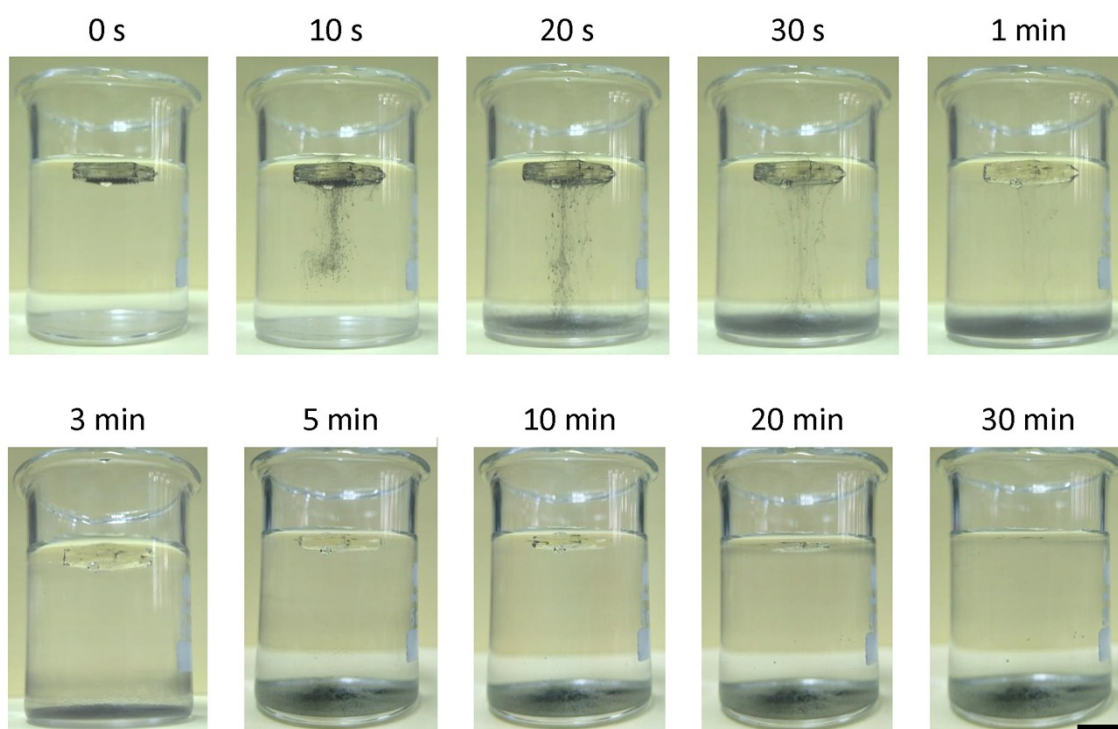


Fig. S6 Dissolution photographs of a MN in PBS with prolonged durations (pH = 7.4). The temperature started at 37 °C, and later decreased slowly to room temperature. Scale bar: 5 mm.

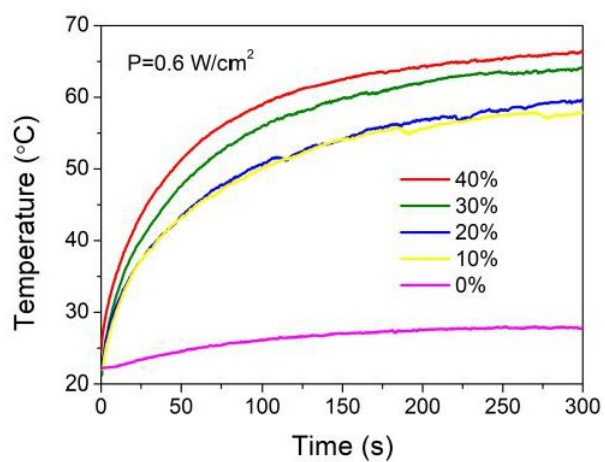


Fig. S7 Temperature changes of MNs with different Nb₂C contents (0%, 10%, 20%, 30%, and 40%) under irradiation of NIR laser (1064 nm) at a power density of 0.6 W/cm².

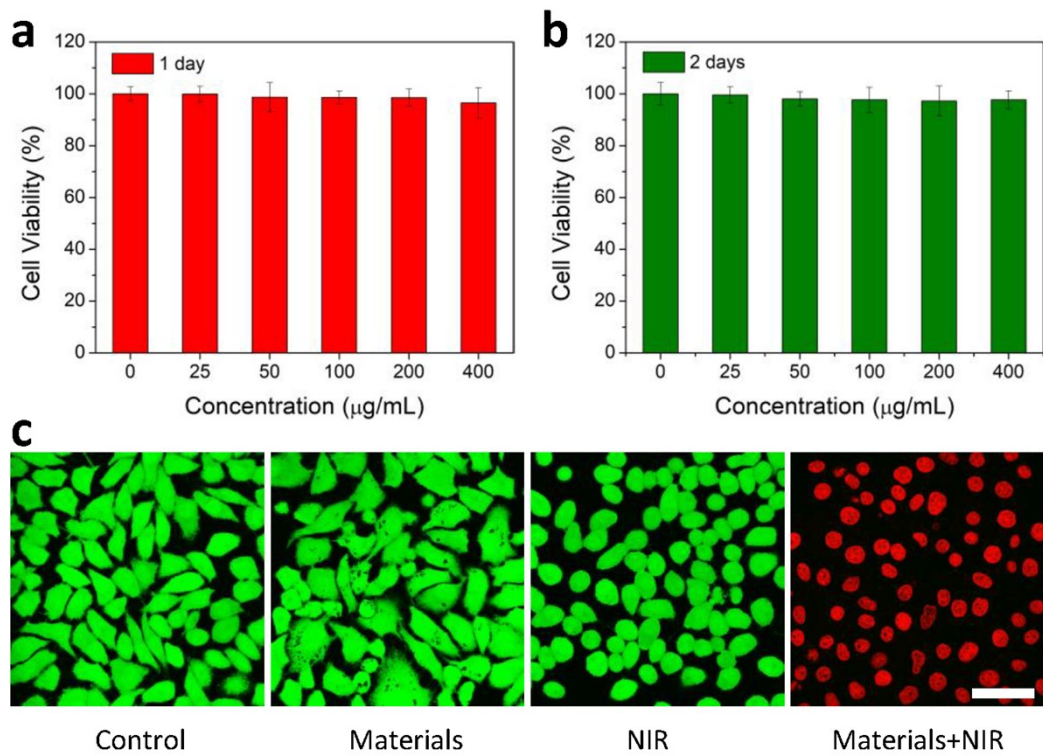


Fig. S8 (a, b) Cytotoxicity assay of 1 day and 2 days for 4T1 cancer cells ($n = 5$). (c) Confocal fluorescence imaging of 4T1 cancer cells after different treatments (Control, Materials, NIR, Materials+NIR). Scale bar: 50 μm .

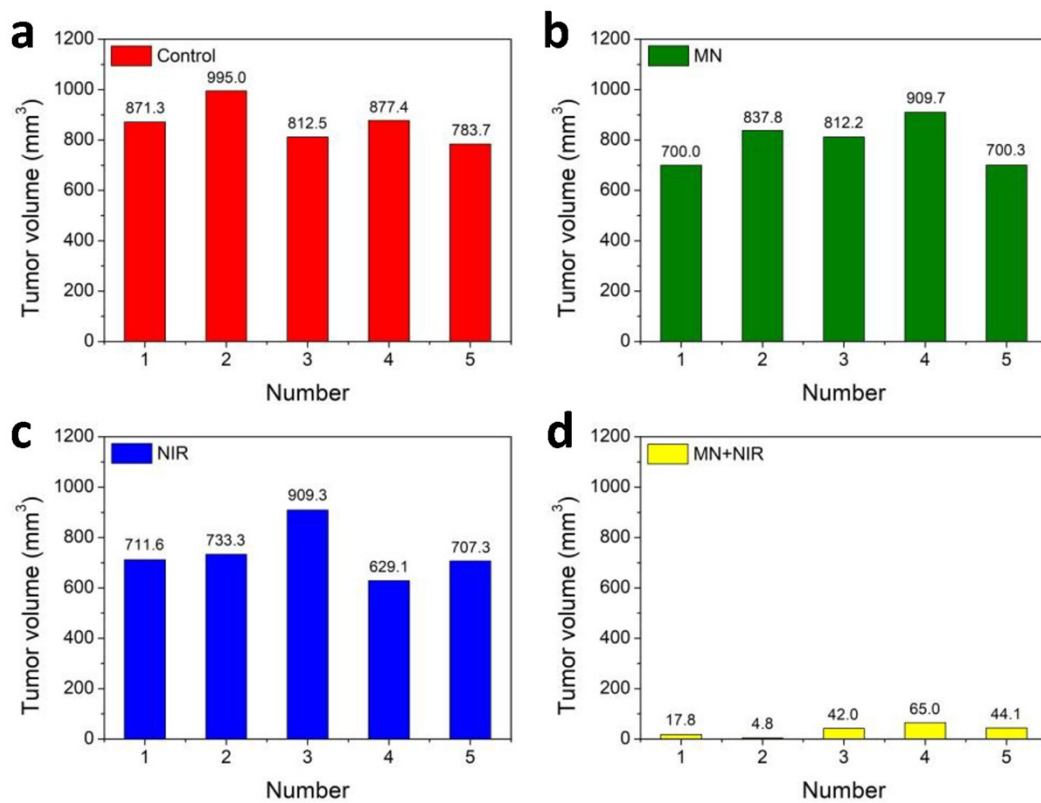


Fig. S9 Tumor volumes of tumor-bearing mice in (a) Control group, (b) MN group, (c) NIR group, and (d) MN+NIR group after the whole treatment (5 mice per group).

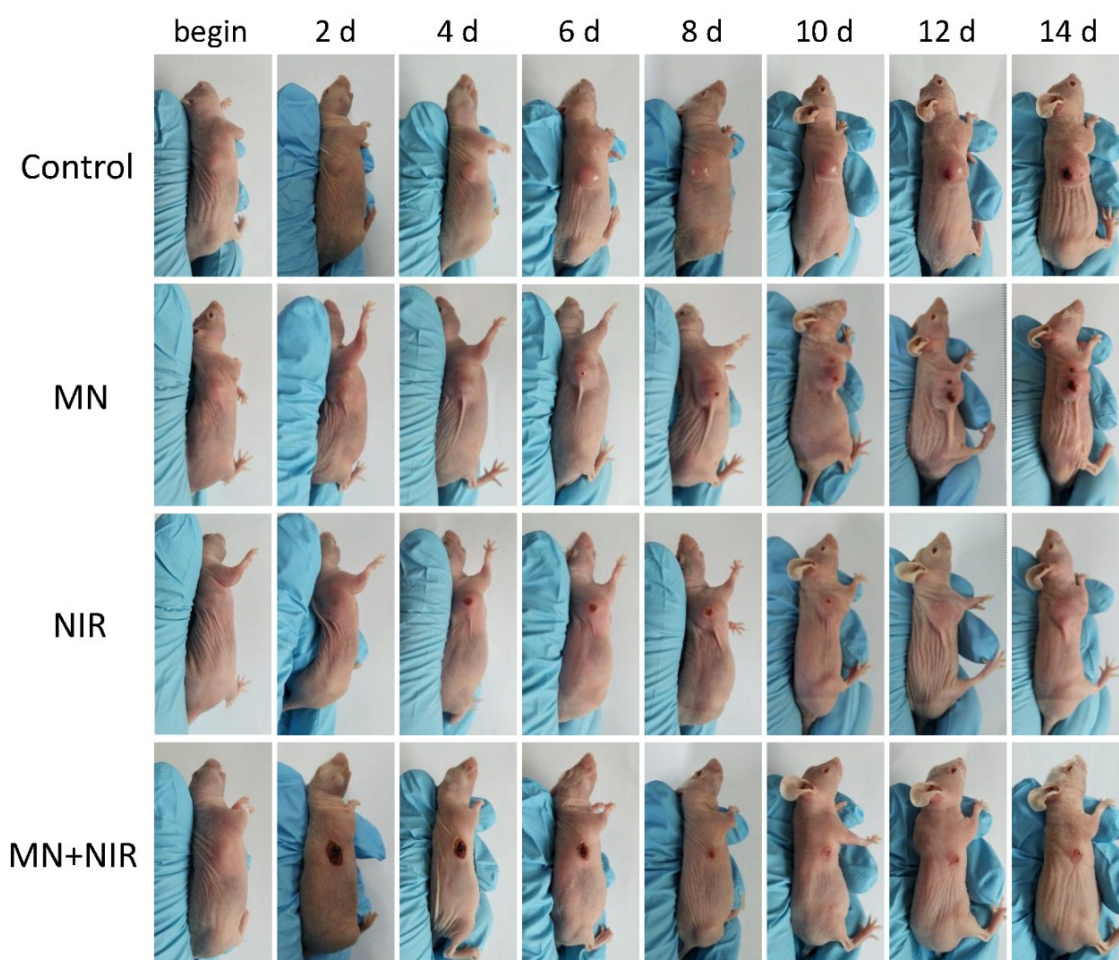


Fig. S10 Representative images of tumor-bearing mice after different treatments during two-weeks period.