Supporting Information

Photothermal Properties of MXenes and Sterilization of MRSA by Nb_2C/Gel with Low Power NIR-II laser

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After the laser is irradiated, the solution temperature begins to drop. The data from the solution cooling from the highest temperature to room temperature were collected and the photothermal conversion efficiency (PCE, η) was calculated.

The calculation equation was as follows:

$$\eta = \frac{hS(T_{Max} - T_{Surr}) - Q_{Dis}}{I(1 - 10^{-A})}$$

$$hS = \frac{c_D m_D}{\tau_s}$$

$$\tau_s = - \frac{dt}{dln\theta}$$

$$\theta = \frac{T - T_{Surr}}{T_{Max} - T_{Surr}}$$

$$Q_{Dis} = \frac{c_D m_D (T_{Max(water)} - T_{Surr})}{\tau_{s(water)}}$$

where T_{Max} is the photothermal saturation temperature of the sample (°C), T_{Surr} was the ambient temperature (°C), I was laser power (W), A is the absorbance of the sample at a specific laser wavelength. S was container surface area, and h was heat-transfer coefficient. Addition, m_D and c_D are the specific heat capacity of the mass of the solvent (water), respectively. And τ_s is the sample heat transfer time constant. At last, Q_{Dis} is the heat dissipated by the solvent and sample cell.

The infrared thermal images of different materials during different periods of laser irradiation are shown below.

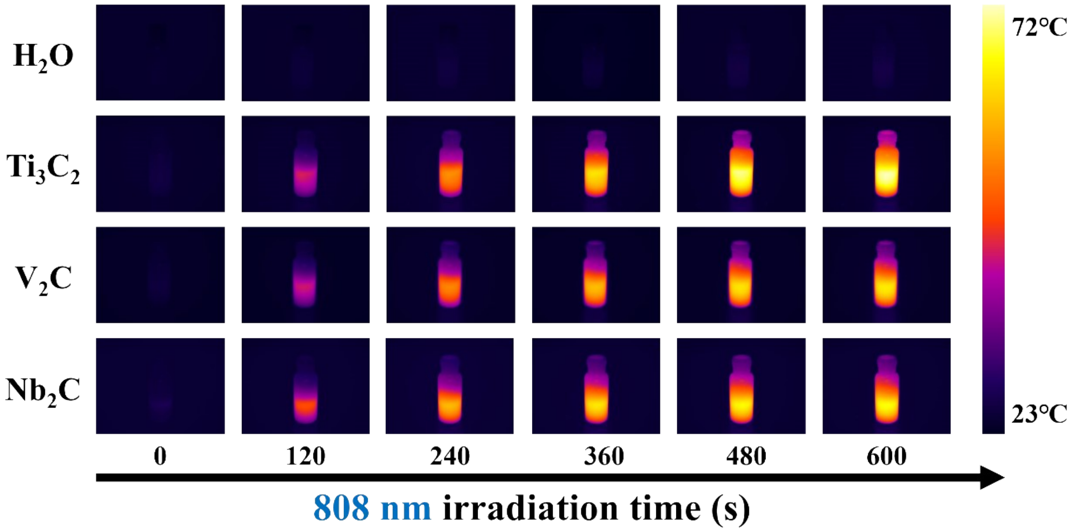

Fig. S1 Infrared image of Ti_3C_2, Nb_2C and V_2C under 808 nm laser (1.5 W) irradiation. It was recorded every 120 s. H_2O was the control.

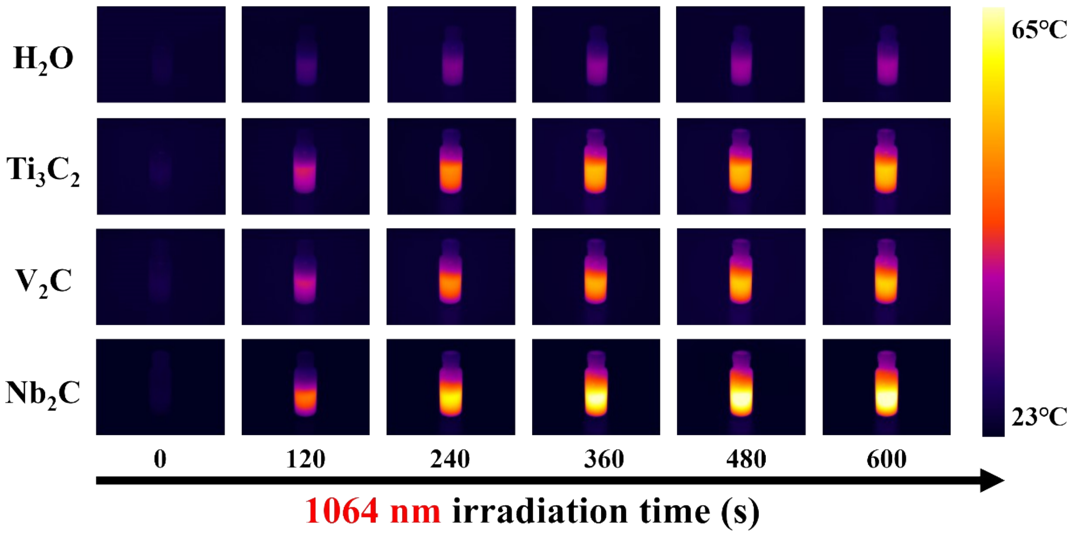

Fig. S2 Infrared image of Ti_3C_2, Nb_2C and V_2C under 1064 nm laser (1.5 W) irradiation. It was recorded every 120 s. H_2O was the control.

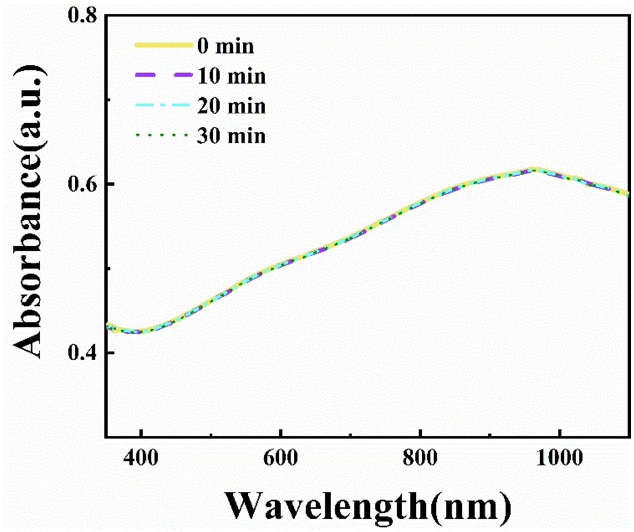

Fig. S3 Absorption spectrum of Nb_2C under 30 minutes laser irradiation.

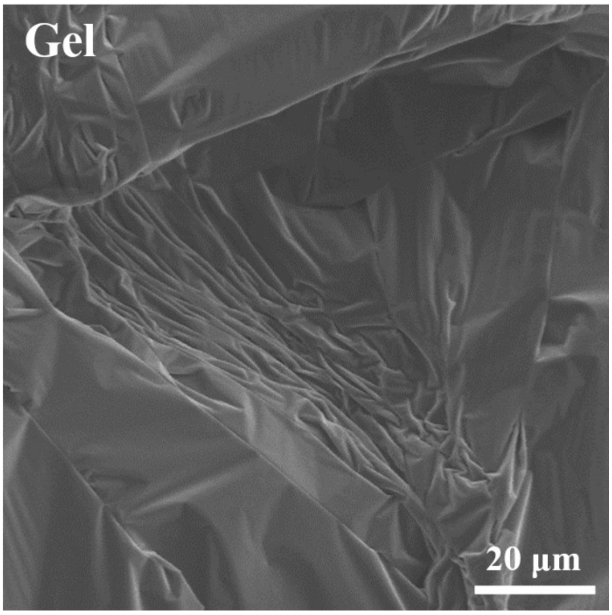

Fig. S4 SEM image of PLGA-PEG-PLGA gel with wrinkled surface.

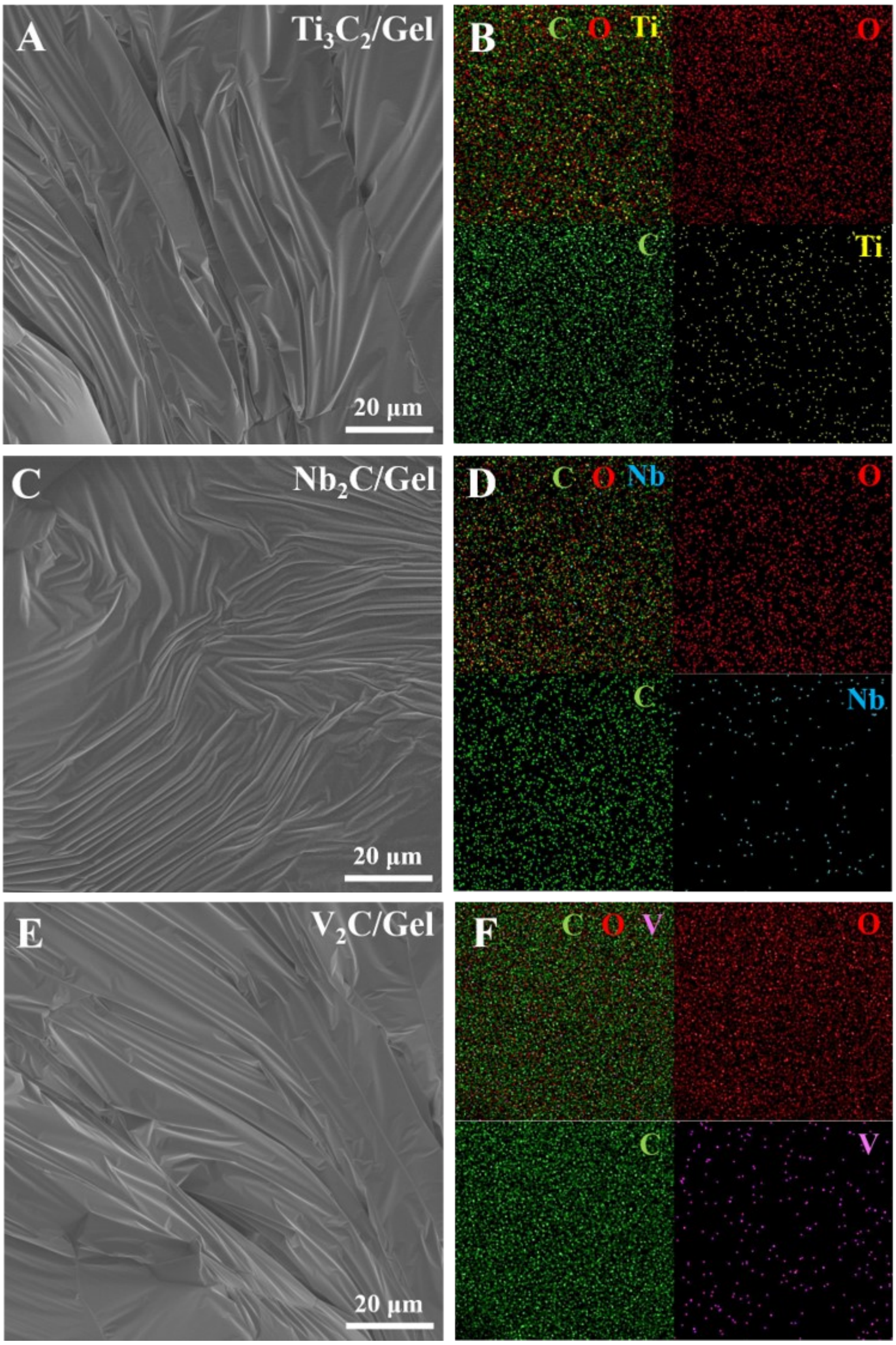

Fig. S5 SEM (A, C and E) and EDS (B, D and F) images of Ti_3C_2/Gel, Nb_2C/Gel and V_2C/Gel.

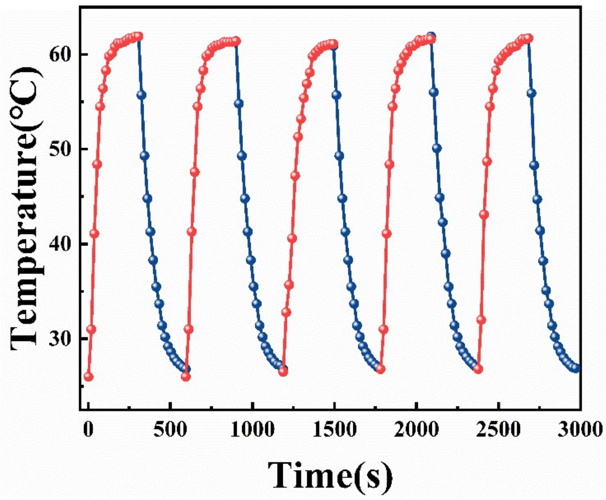

Fig. S6 The photothermal cycle of Nb_2C/Gel in 5 laser on/off cycles.

Table S1 PCE of materials

Materials	Laser	Photothermal efficiency	Ref.
TaN	808 nm	24.8%	[1]
Ta_4C_3	808 nm	44.7%	[2]
V_2N	1064 nm	31.67%	[3]
Mo_2C	1064 nm	43.3%	[4]
Pd Nanosheet/Janus	1064 nm	20%	[5]
WNNS@hydrogel	1064 nm	29.5%	[6]
Ti_2N QDs	1064 nm	45.51%	[7]
Nb_2C	1064 nm	45.55%	This work

Table S2 Antibacterial activity of materials

Materials	Laser	Power	Time	Bacterial Survival Rate	Ref.
PVA/SA-DA20/BTPP$^+$ hydrogel	/	/	12 h	E. coli is 23% S. aureus is 18%	[8]
MCA-NI-AA/NP/ZIF8 hydrogel	808 nm	2.5 W/cm^2	10 min	E. coli is about 45% S. aureus is about 45%	[9]
	808 nm	2.5 W/cm^2	10 min +mixed 1 h	E. coli is about 10% S. aureus is about 10%	
AuNst$_{120}$	/	/	8 h	S. aureus is 40%	[10]
PAI hydrogel	808 nm	1.33 W/cm^2	5 min +mixed 1 h	E. coli is 8% MRSA is 3.8%	[11]
MnCN	1064 nm	1 W/cm^2	10 min	E. coli is 15.3% S. aureus is 8.3%	[12]
Gel (AIPH/POM)	1060 nm	1 W/cm^2	10 min	S. aureus is＞20%	[13]
TMH@Gel	1064 nm	0.64 W/cm^2	10 min +dark 10 min	S. aureus is about 3% E. coli is about 15%	[14]
Nb_2C/Gel	1064 nm	0.99 W/cm^2	5 min	MRSA is 7.52%	This work

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