Supporting Information

Light-driven Ti₃C₂ MXene Micromotors: Self-propelled Autonomous Machines

for Photodegradation of Nitroaromatic Explosive

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TiO₂@Ti₃C₂/Pt micromotors motion during UV light illumination (**Video S1**).

 $TiO_2 @Ti_3C_2/Pt$ micromotors self-propullsion at 2.5% and 7% H_2O_2 decomposition on the Pt surface, **Video S2.**

 $TiO_2@Ti_3C_2/Pt$ micromotors motion with UV light illumination off and on in presence of 0.1 M NaCl (**Video S3**).



Figure S1. XRD and HR-XPS spectra of Ti_3C_2 nanoflakes.

Τί ₃ C ₂	-Tî - 10 jum	С; 10 µm.	0 10 jum	F 1 <u>0 بن</u> س	
Ti ₃ C ₂ /Pt	ті	С	О	F	Рt
	10 µm	10 µm	<u>10 µт</u>	10 µm	10 µm

Figure S2. EDX mapping from SEM image of Ti_3C_2 nanoflakes and $TiO_2@Ti_3C_2/Pt$ micromotors obtained after Pt sputtering.



Figure S3. EDX spectra from SEM images of Ti_3C_2 nanoflakes and $TiO_2@Ti_3C_2/Pt$ micromotors obtained after Pt sputtering process.



Figure S4. HR-XPS spectra of Ti_3C_2 nanoflakes (A) and $TiO_2@Ti_3C_2/Pt$ micromotors (B) dispersed in water, region Ti 2p.



Figure S5. Tafel plots of $TiO_2@Ti_3C_2/Pt$ micromotors under UV light illumination (red line) and without UV light illumination (dark line) as well TiO_2 nanoparticles (green line) under UV light illumination as control.



Figure S6. TiO₂@Ti₃C₂/Pt micromotor performance in different H_2O_2 concentrations.



Figure S7. Digital photo of UV irradiation setup.



Figure S8. TNT photodegradation by $TiO_2@Ti_3C_2/Pt$ micromotors and its respective controls: (a) TNT solution with Ti_3C_2 under UV light illumination; (b) TNT solution with $TiO_2@Ti_3C_2/Pt$ micromotors and not UV light illumination; (c) TNT solution with $TiO_2@Ti_3C_2/Pt$ micromotors under light illumination; (d) TNT solution under UV light illumination; (e) $TiO_2@Ti_3C_2/Pt$ micromotors with TNT under UV light illumination. 5mM TNT concentration was used in all experiments.



Figure S9. Stability test of TNT solution with Ti_3C_2 under UV light illumination. Recovery analysis was done using 0.5 mM of TNT.