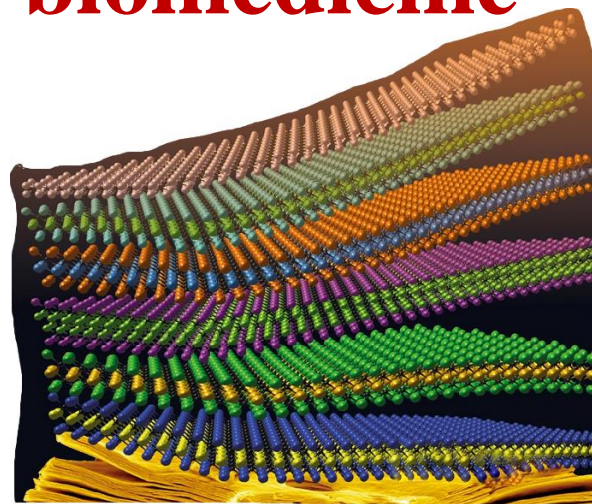
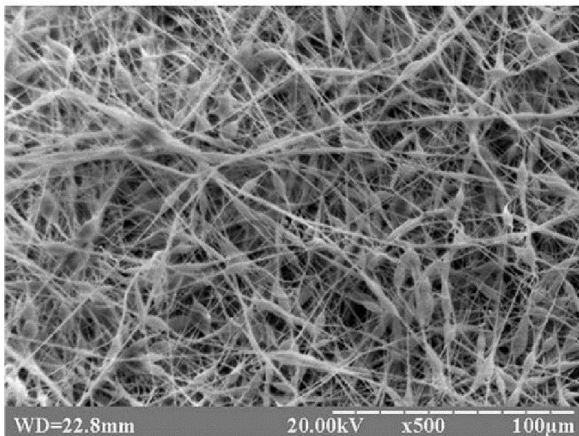




MXenes, novel 2D nanomaterials, in various industries and in biomedicine



Jean Monnet Support to Associations EUforUA

Nanofiber picture courtesy of **M. Pogorielov et al. 2018**, In vitro degradation and in vivo toxicity of NanoMatrix3D[®] polycaprolactone and poly(lactic acid) nanofibrous scaffolds. J Biomed Mater Res A 106(8):2200-2212.

MXene picture courtesy of **B. Anasori & Y. Gogotsi (Ed.)**, 2D Metal Carbides and Nitrides (MXenes), Springer 2019.



ZMB

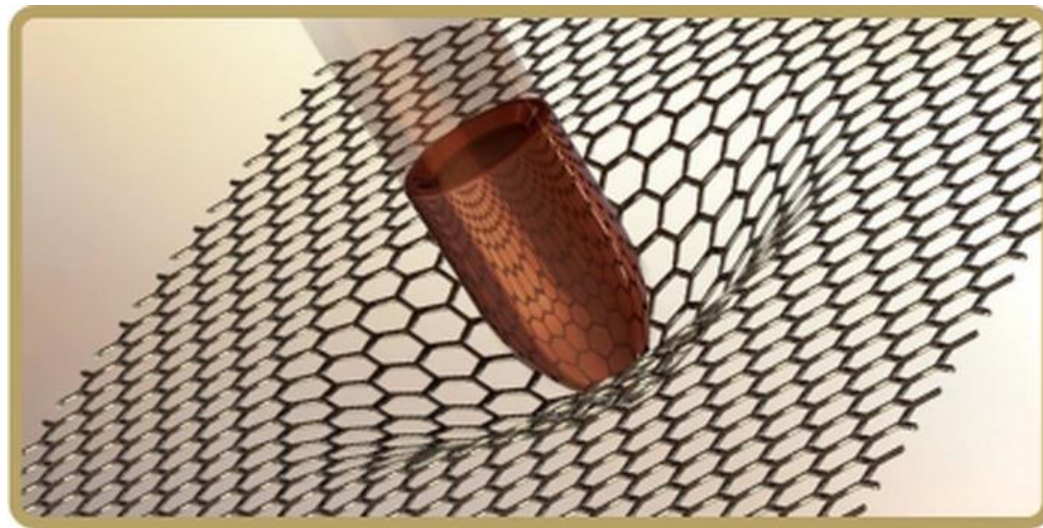
Zentrum für Medizinische Biotechnologie
Center of Medical Biotechnology



МЕДИЧНИЙ
ЦЕНТР



MXenes \neq graphene



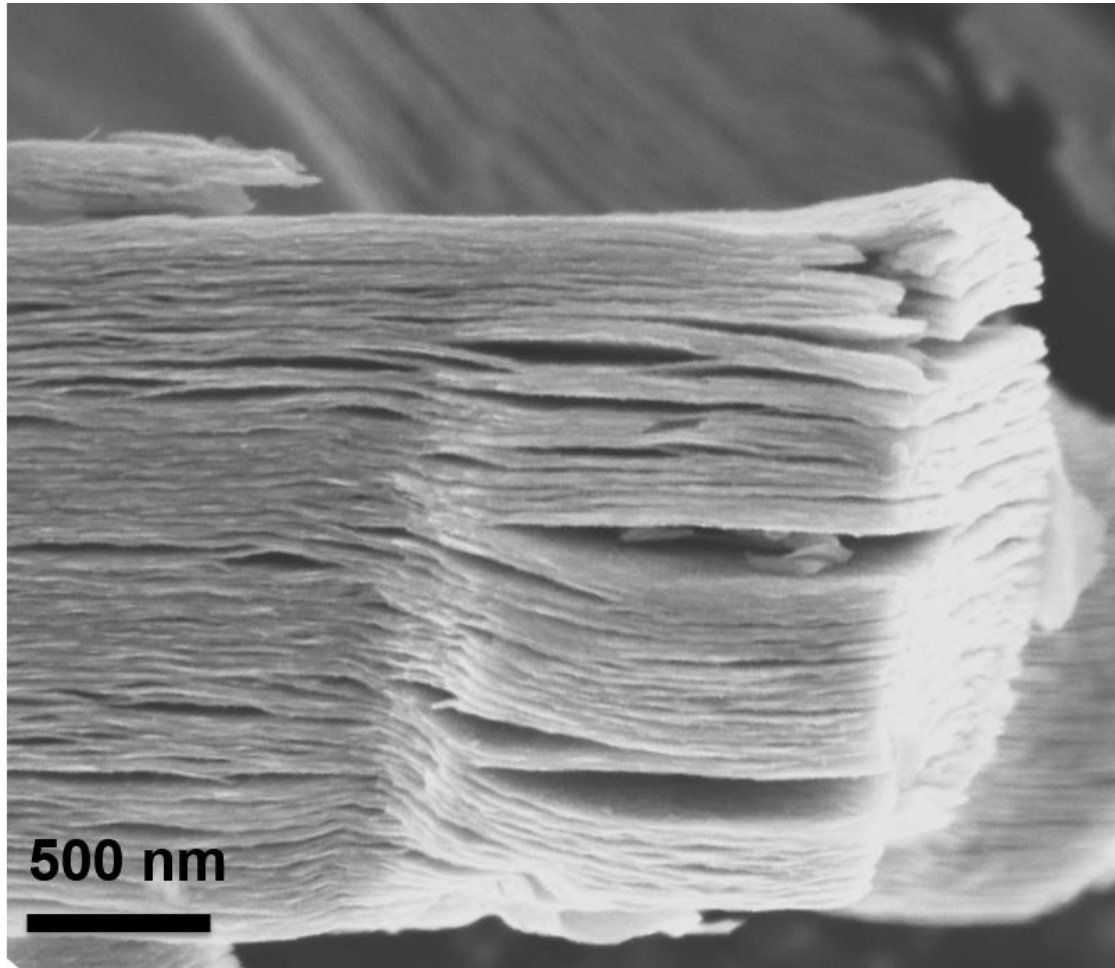
M_2X

M_3X_2

M_4X_3

Mono-transition metal MXenes

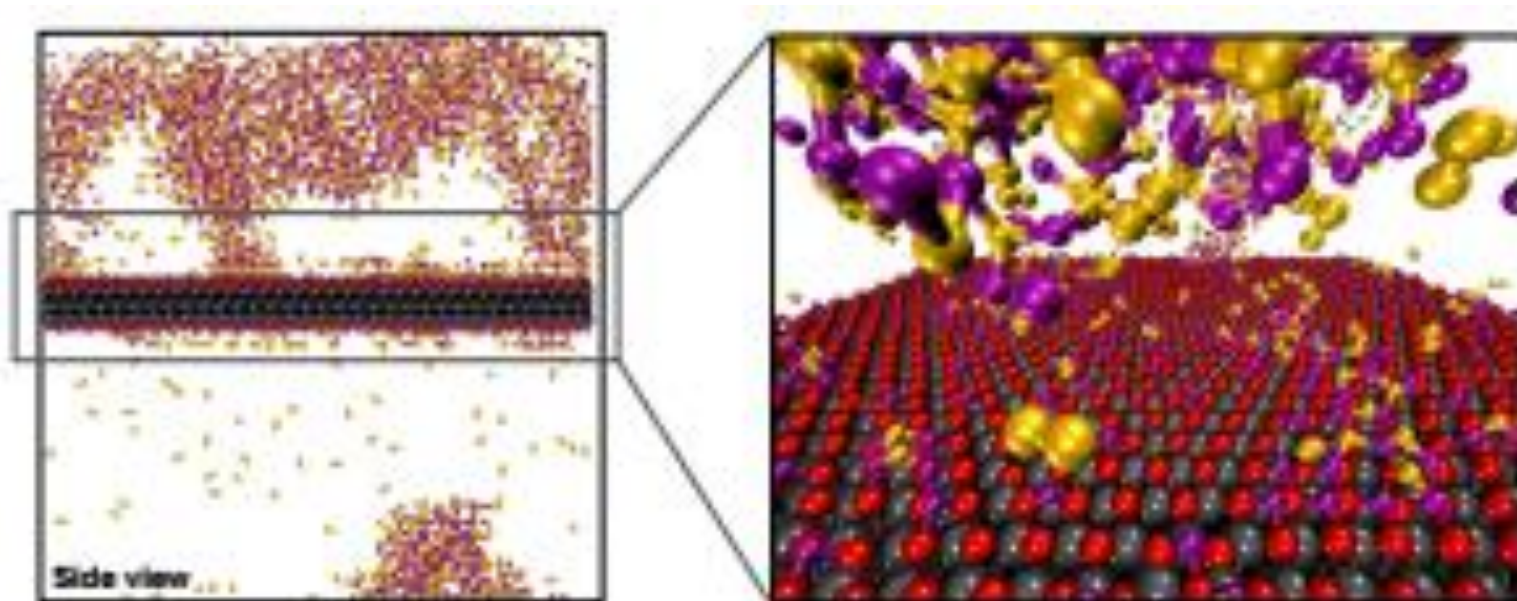




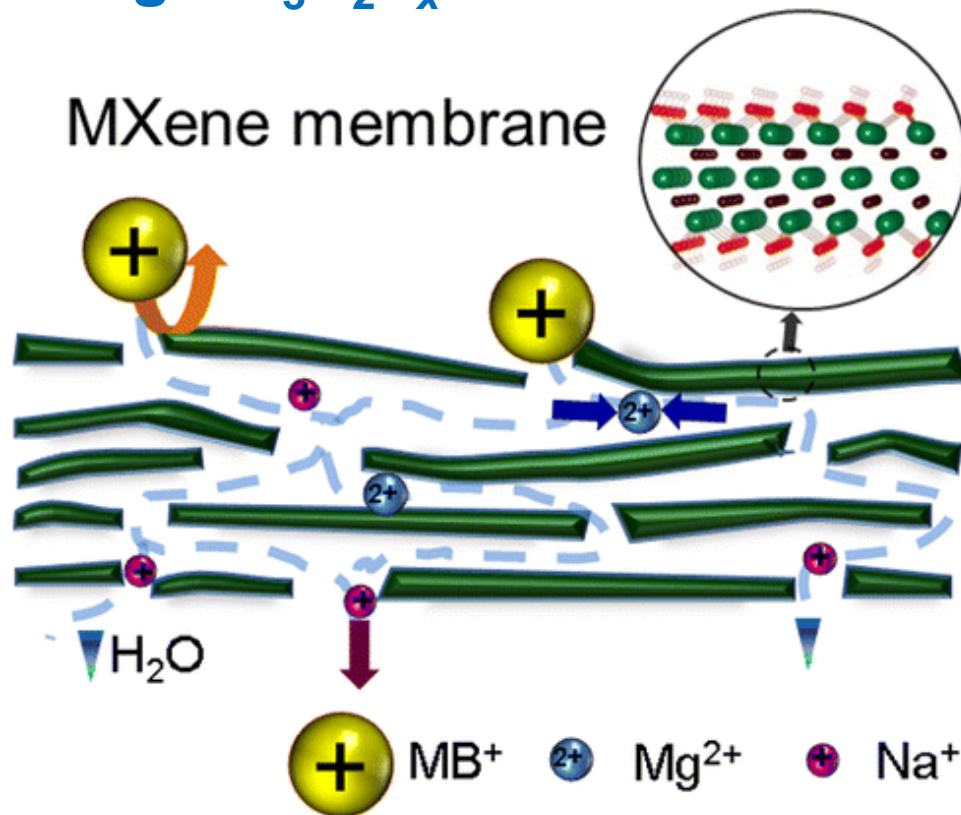
Mxenes:

- Li-ion batteries and supercapacitors)
- composites, photocatalysis
- water purification
- gas sensors
- transparent conducting electrodes
- neural electrodes
- metamaterial
- SERS substrate
- photonic diode
- electrochromic device
- triboelectric nanogenerator

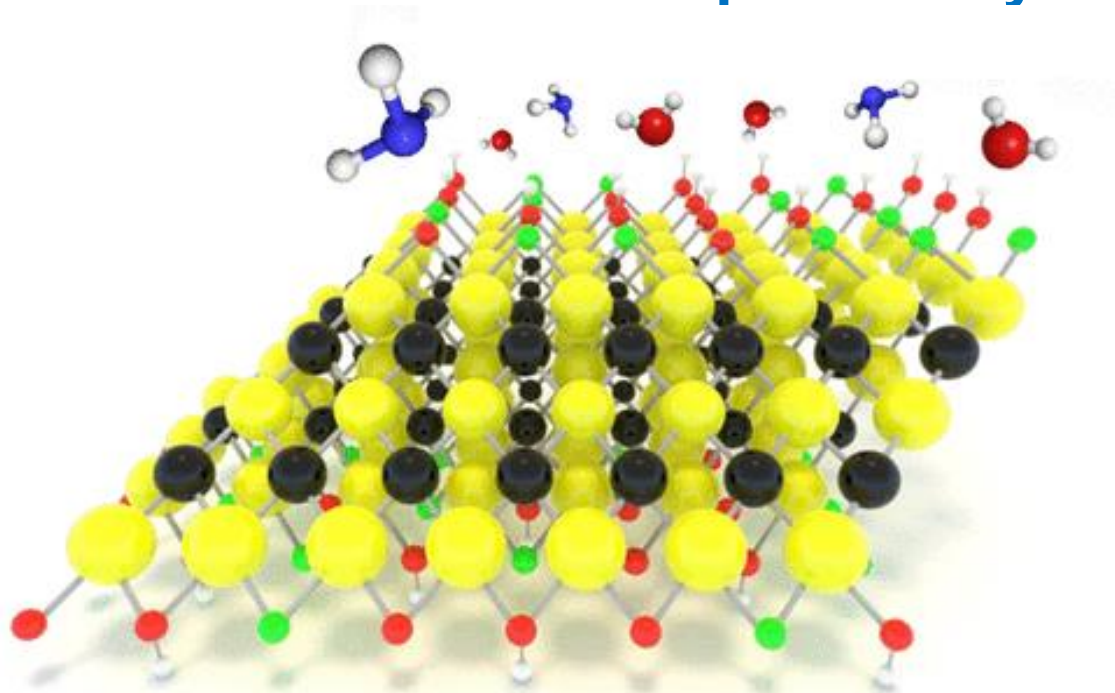
Functionalization of 2D materials for enhancing OER/ORR catalytic activity in Li–oxygen batteries



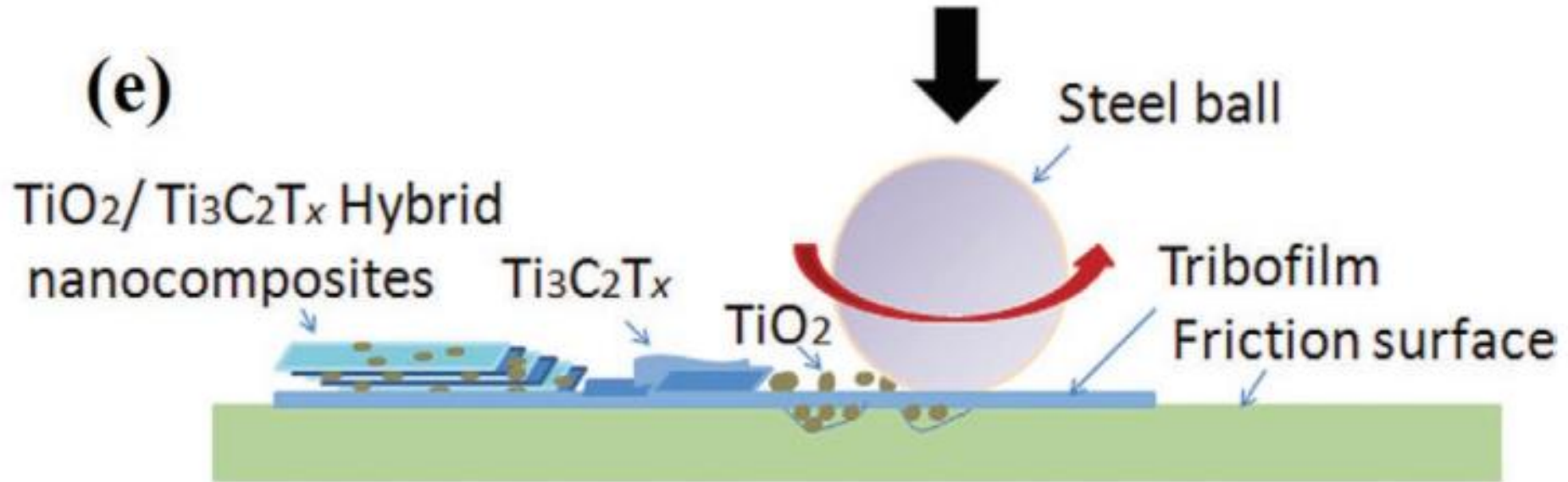
Charge- and Size-Selective Ion Sieving Through $\text{Ti}_3\text{C}_2\text{T}_x$ MXene Membranes



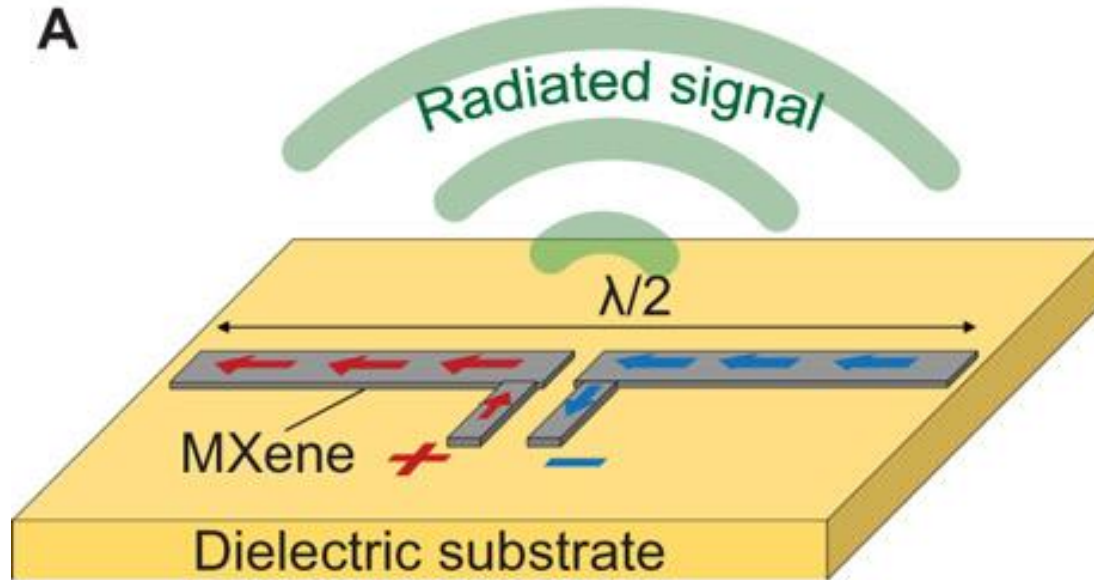
Titanium Carbide MXene as NH_3 Sensor: Realistic First-Principles Study



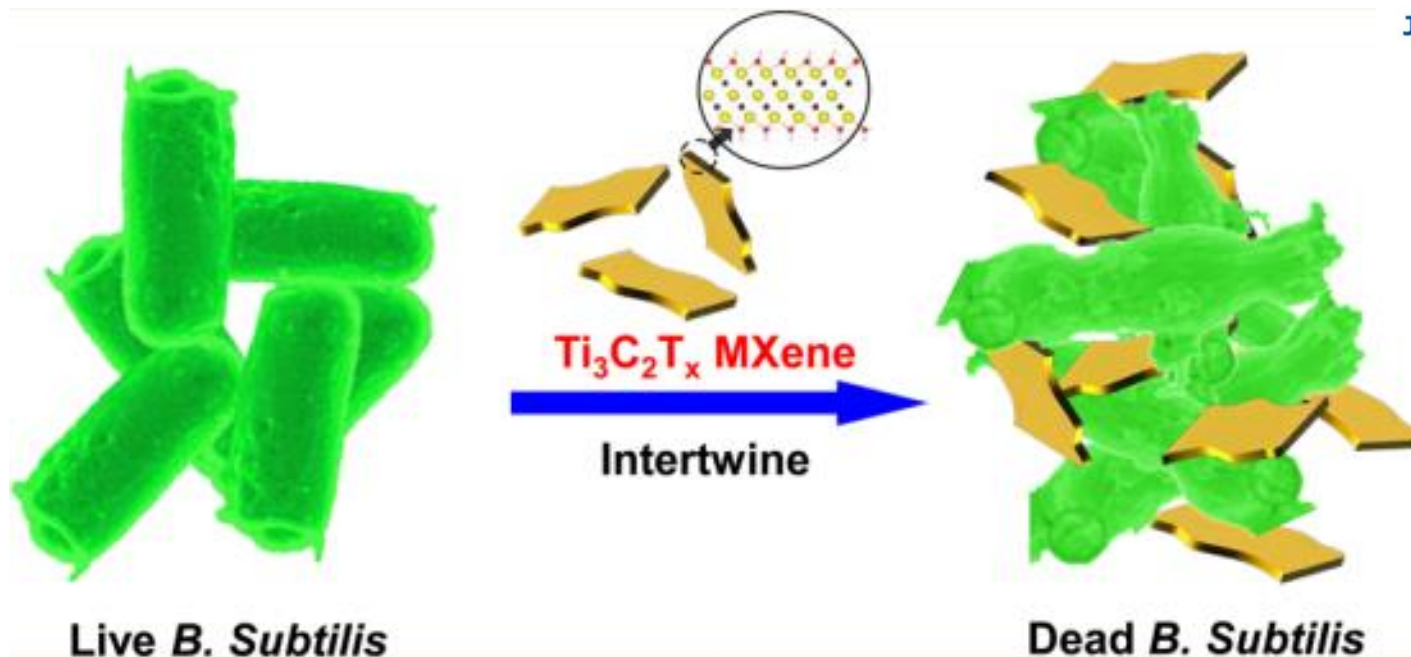
Mechanotribological Aspects of MXene-Reinforced Nanocomposites



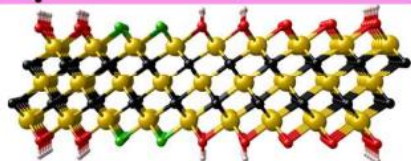
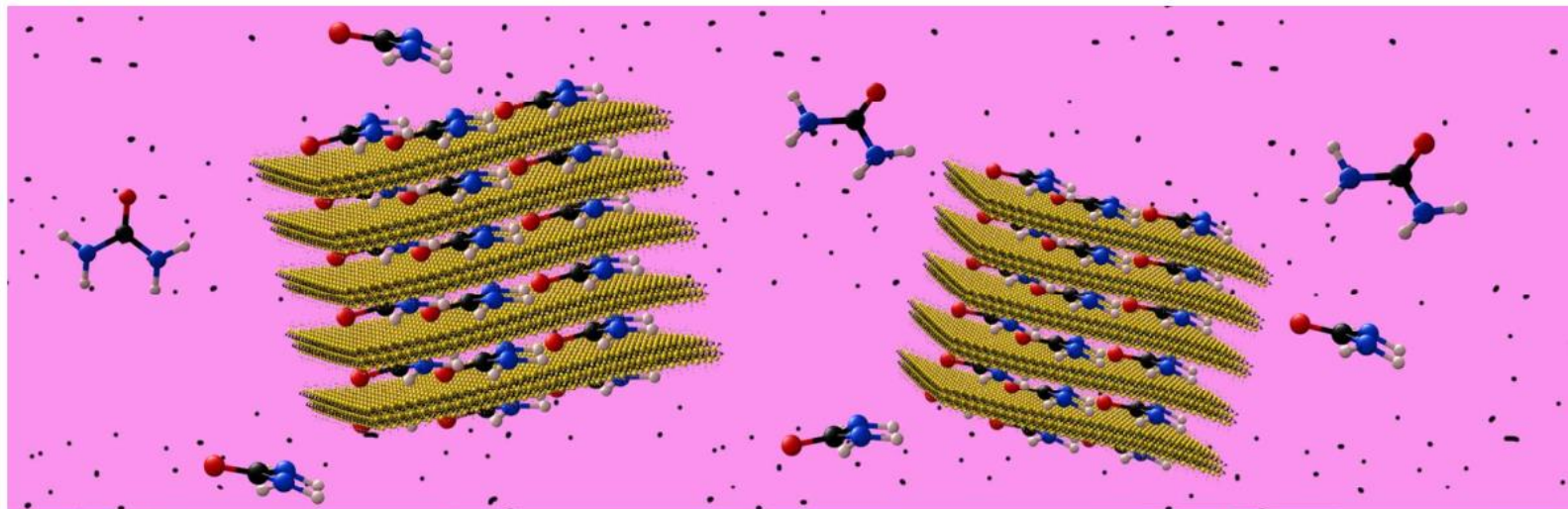
2D titanium carbide (MXene) for wireless communication



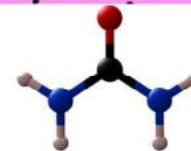
Antibacterial Activity of $\text{Ti}_3\text{C}_2\text{T}_x$ MXene



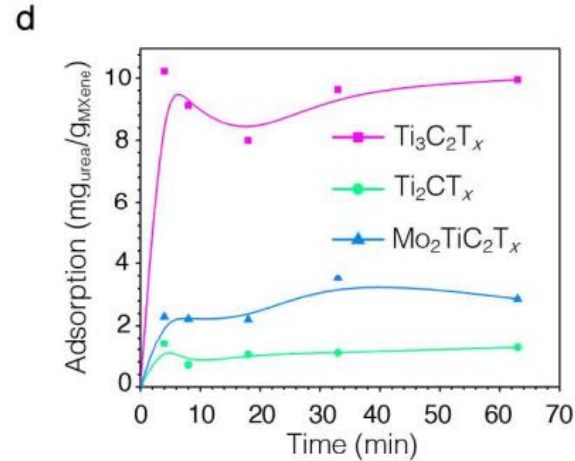
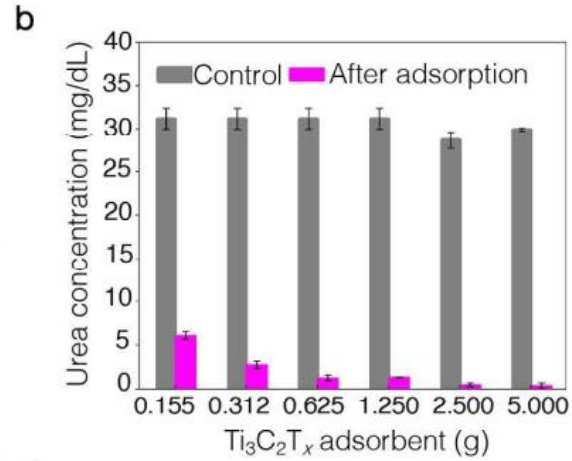
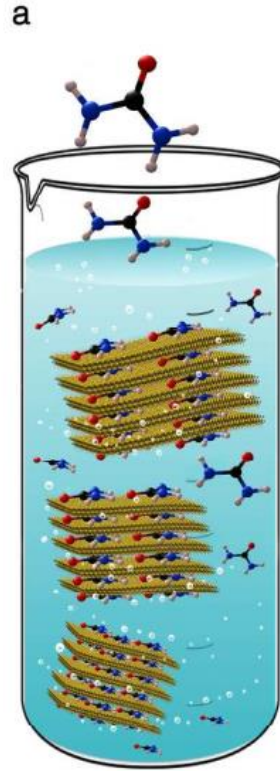
MXene Sorbents for Removal of Urea from Dialysate: A Step toward the Wearable Artificial Kidney



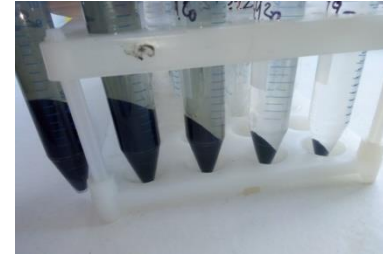
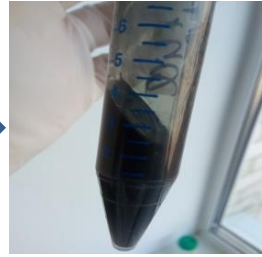
2D $\text{Ti}_3\text{C}_2\text{T}_x$ MXene



urea



Delamination: segregation of multilayered MXenes into single layer flakes



Increased layer spacing is clearly observable

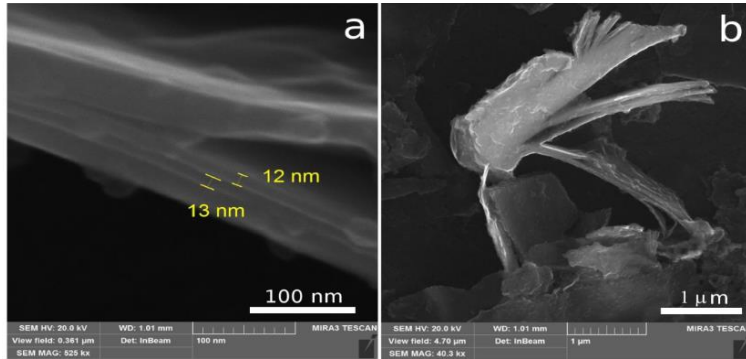


Image courtesy of MRC

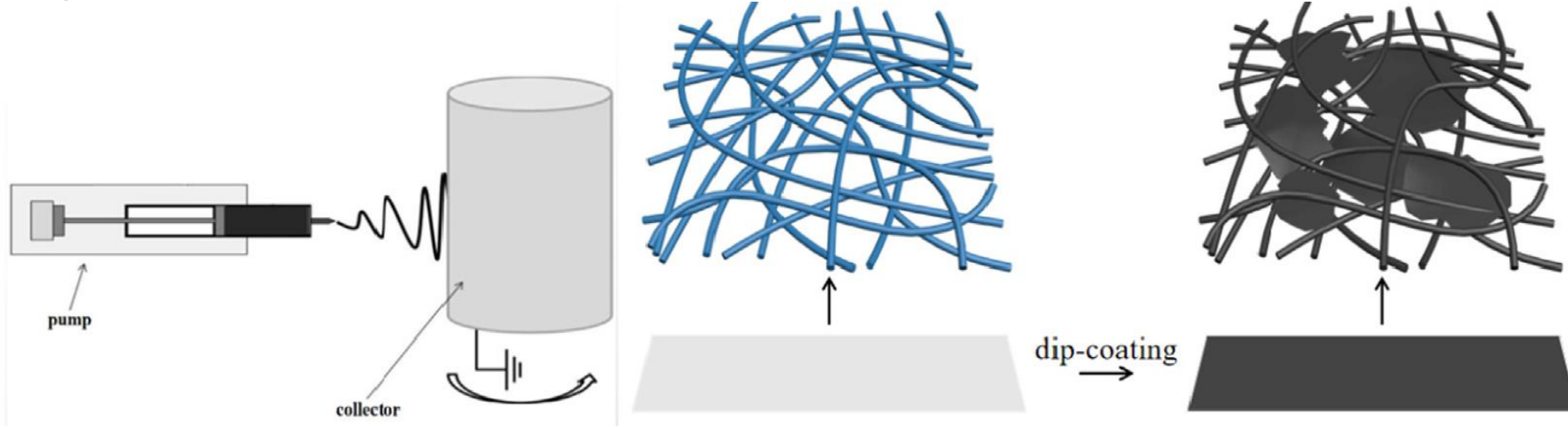


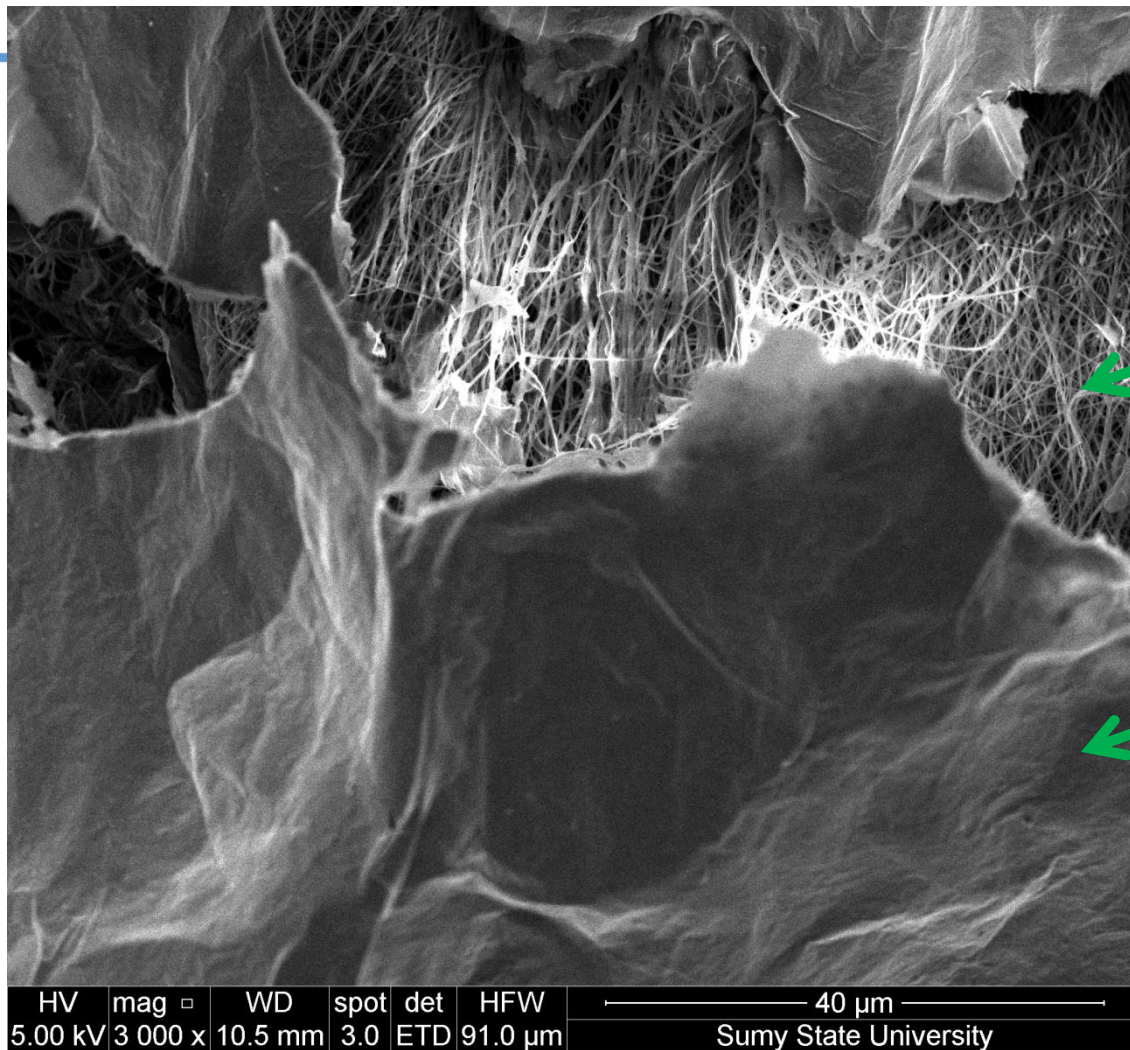
Electrospun nanofiber
mats



3D porous Ti
scaffolds

Electrospinning / dip coating





PCL fibers

MXene foil

MXenes on 3D porous Ti scaffolds

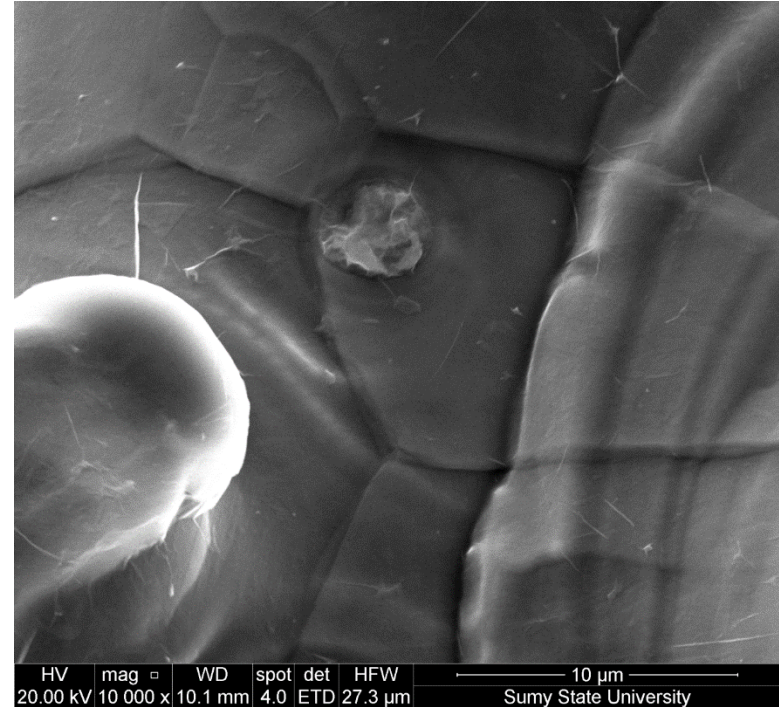
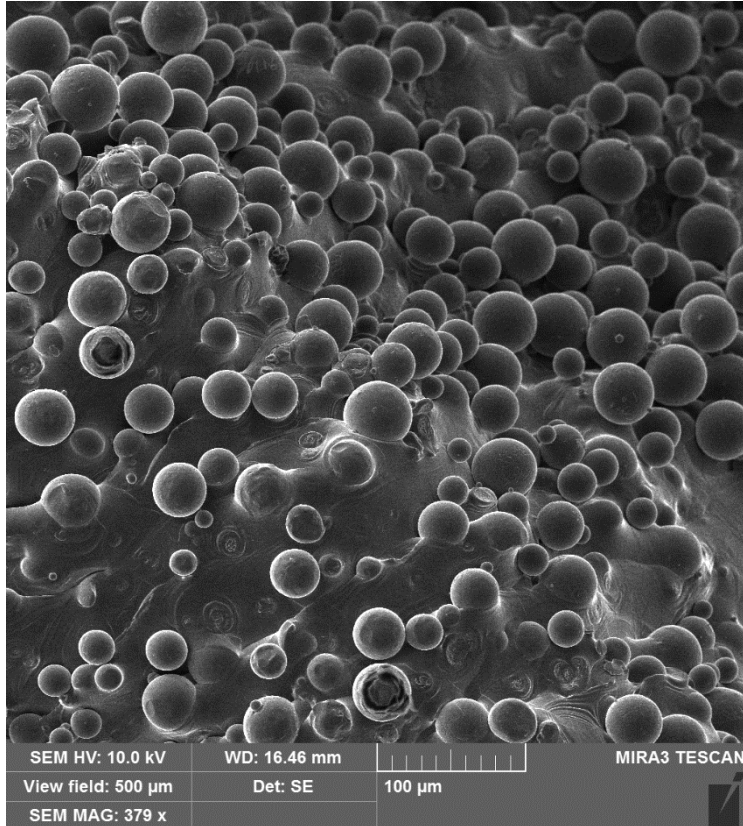
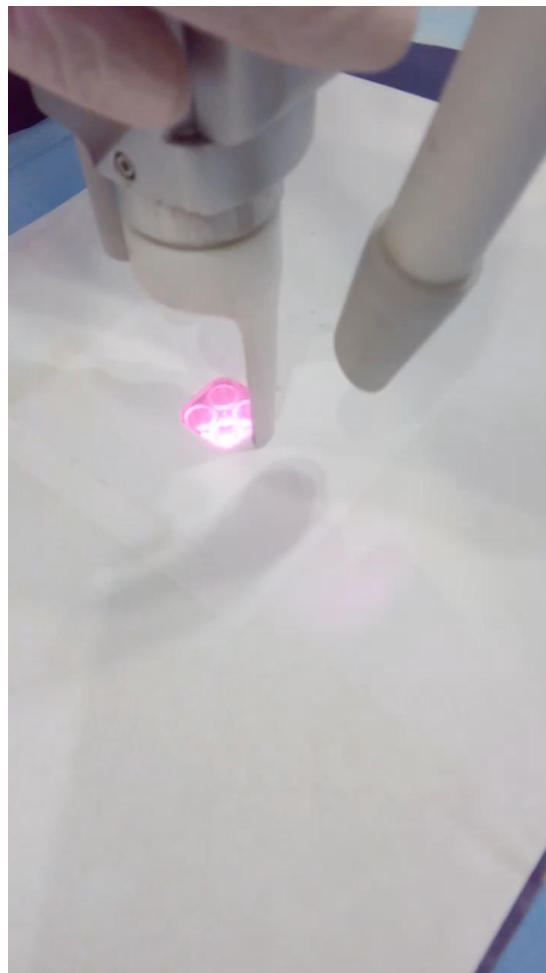
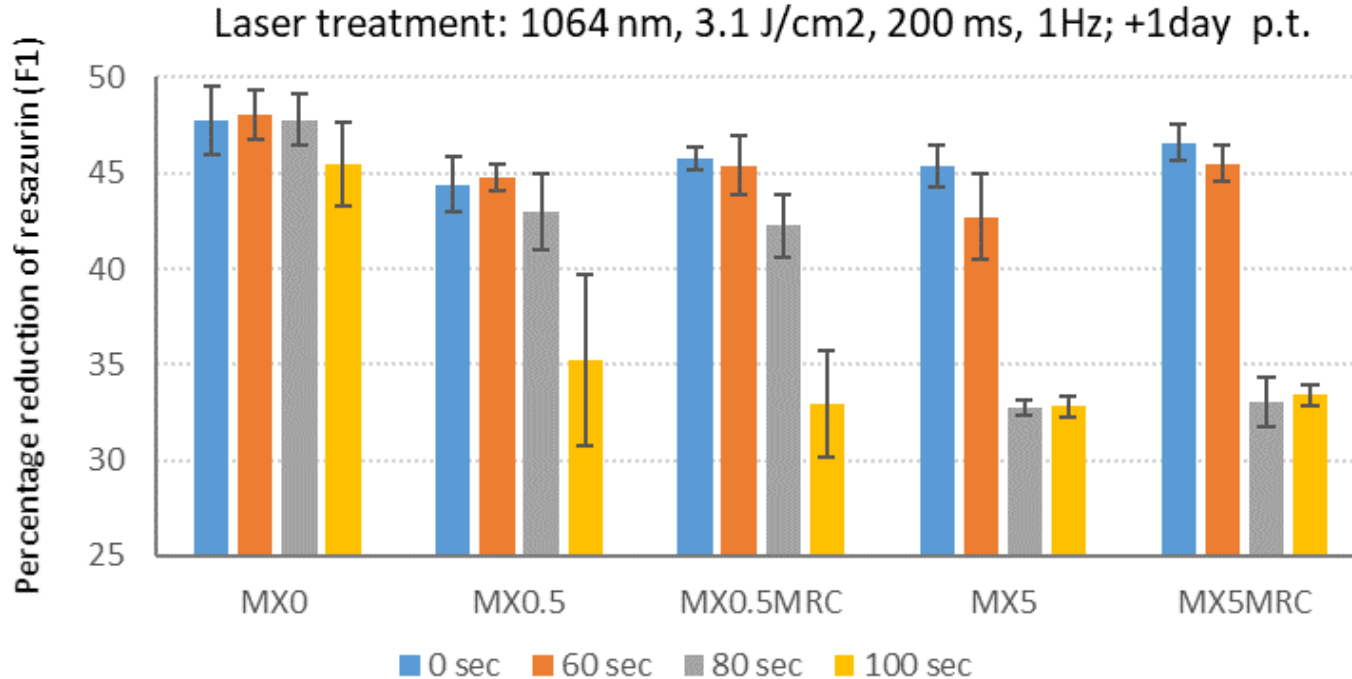


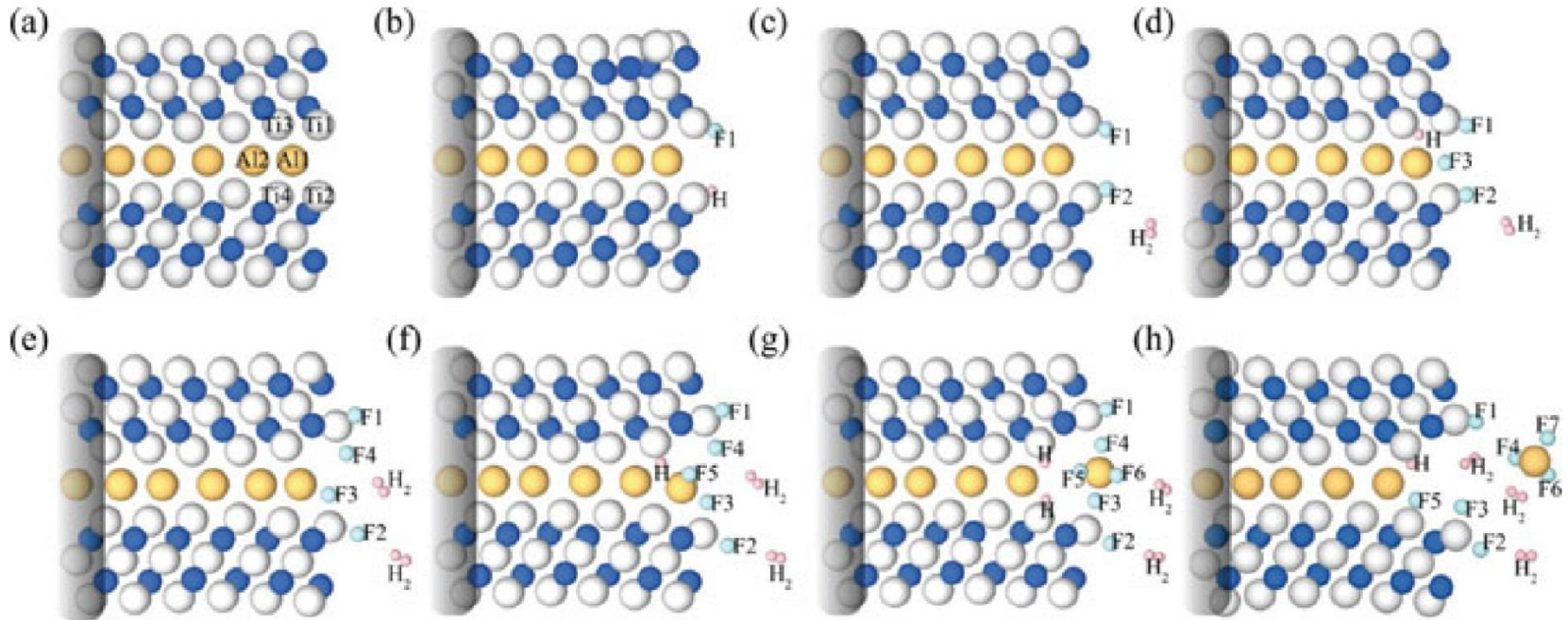
Image courtesy of MRC



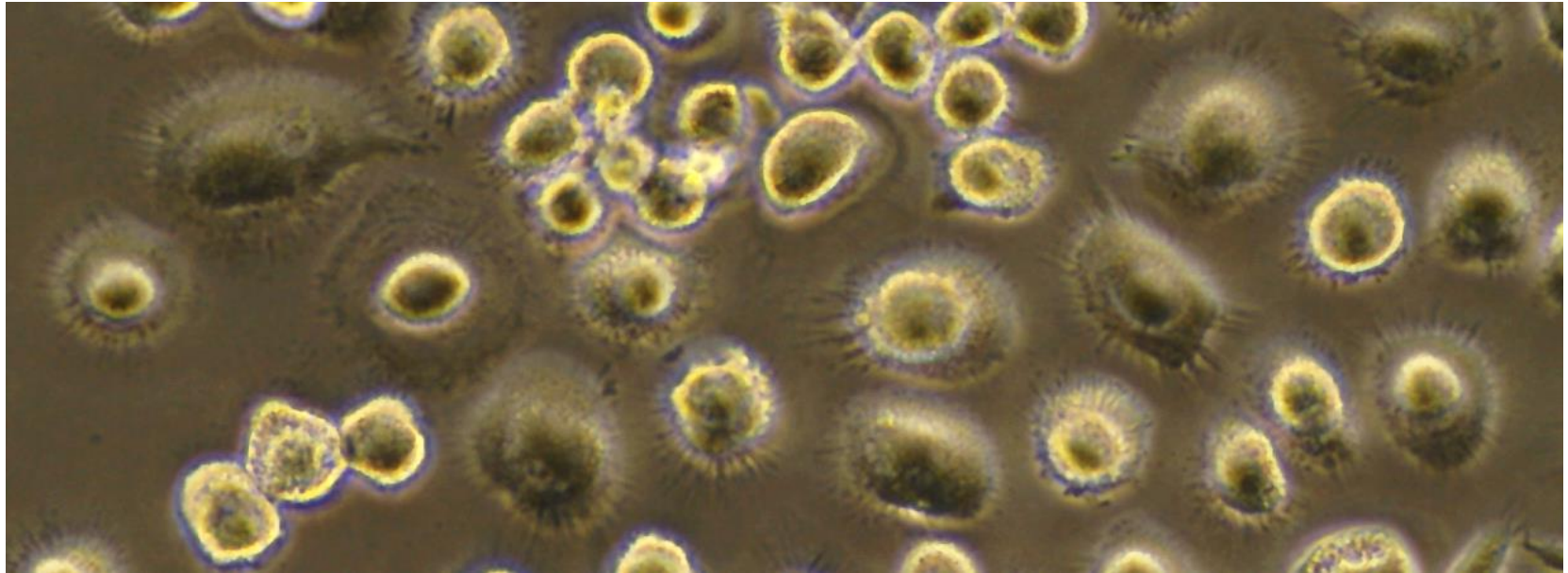
MXenes: photothermal effect



Possibilities for covalent functionalization of MXenes



Human macrophages in cell culture





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Zentrum für Medizinische Biotechnologie
Center of Medical Biotechnology



KIITOS
DĚKUJI
ДЯКУЮ
СПАСИБО
THANK YOU
DANKE SCHÖN
MUITO OBRIGADO

