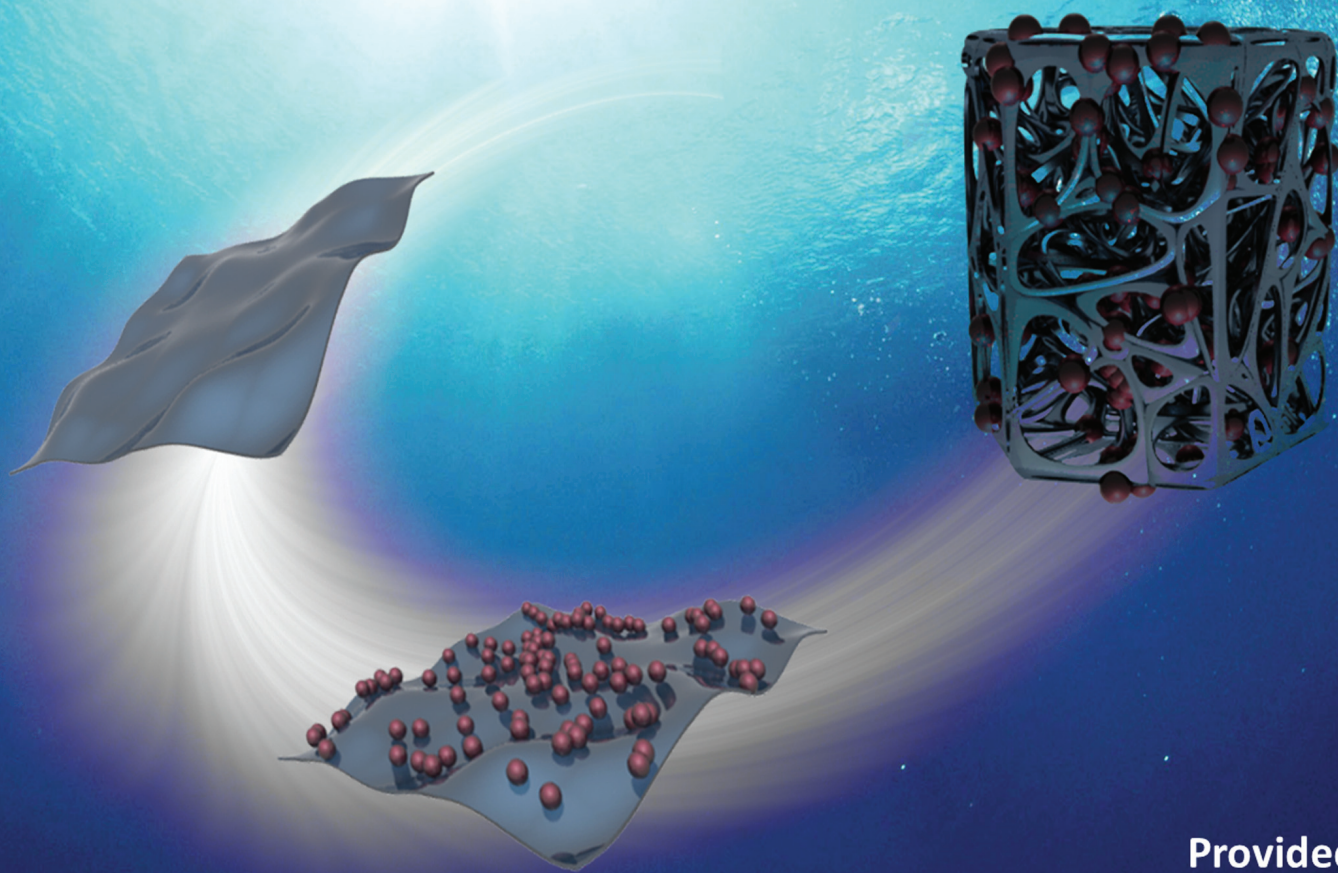


Robust and easily retrievable MXene-based hydrogel catalyst



Provided by
Xiuqiang Xie's group, Hunan Univ., China



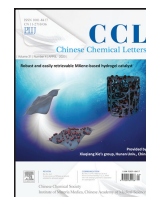
ISSN 1001-8417





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Graphical Abstracts/Chin Chem Lett 31 (2020) iii–ix

Special Issue: MXenes

Editorial

Chinese Chemical Letters 31 (2020) 919

MXenes – The fastest growing materials family in the two-dimensional world

Bin Xu^a, Yury Gogotsi^b^a State Key Laboratory of Organic-Inorganic Composites, Beijing Key Laboratory of Electrochemical Process and Technology for Materials, Beijing University of Chemical Technology, Beijing 100029, China^b A.J. Drexel Nanomaterials Institute, Department of Materials Science and Engineering, Drexel University, Philadelphia, PA 19104, United States

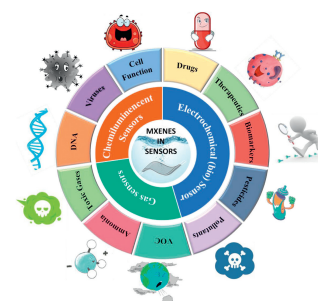
Reviews

A mini-review on MXenes as versatile substrate for advanced sensors

Razium Ali Soomro^{a,b}, Sana Jawaid^c, Qizhen Zhu^b, Zaheer Abbas^b, Bin Xu^b^a Beijing Advanced Innovation Center for Soft Matter Science and Engineering, Beijing University of Chemical Technology, Beijing 100029, China^b State Key Laboratory of Organic-Inorganic Composites, Beijing Key Laboratory of Electrochemical Process and Technology for Materials, Beijing University of Chemical Technology, Beijing 100029, China^c National Centre of Excellence in Analytical Chemistry, University of Sindh, Jamshoro 76080, Pakistan

The review provides a concise summary of recent works carried in the area of electro-chemical driven sensor systems which particularly utilize MXenes or its derivatives as hybrids or composites to serve as a suitable direct or indirect transducer platform.

Chinese Chemical Letters 31 (2020) 922

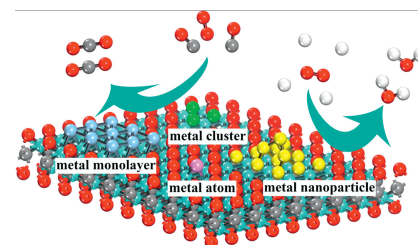


Recent progress of MXenes as the support of catalysts for the CO oxidation and oxygen reduction reaction

Yiying Zhang^a, Xilin Zhang^a, Cheng Cheng^b, Zongxian Yang^{a,c}^a School of Physics, Henan Normal University, Xinxiang 453007, China^b College of Chemistry, Key Laboratory of Theoretical & Computational Photochemistry of Ministry of Education, Beijing Normal University, Beijing 100875, China^c National Demonstration Center for Experimental Physics Education (Henan Normal University), Xinxiang 453007, China

MXenes as the support of catalysts for CO oxidation reaction and oxygen reduction reaction by compositing with metal atoms, metal nanoparticles, metal monolayer or some other 2D materials.

Chinese Chemical Letters 31 (2020) 931



Chemistry of two-dimensional MXene nanosheets in theranostic nanomedicine

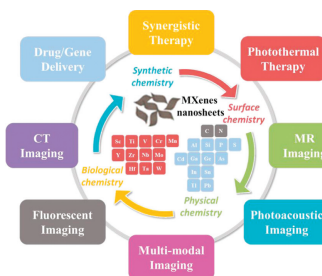
Yuemei Wang^{a,b}, Wei Feng^a, Yu Chen^{a,b}

^a State Key Laboratory of High Performance Ceramics and Superfine Microstructure, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai 200050, China

^b Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Science, Beijing 100049, China

This review provides the recent research progress of 2D MXenes and their intrinsic chemistry in theranostic nanomedicines, focusing on the synthetic chemistry for MXene construction, surface chemistry for surface engineering, physiochemical property for theranostic application and biological chemistry for biosafety evaluation.

Chinese Chemical Letters 31 (2020) 937



Two-dimensional hybrid nanomaterials derived from MXenes ($\text{Ti}_3\text{C}_2\text{T}_x$) as advanced energy storage and conversion applications

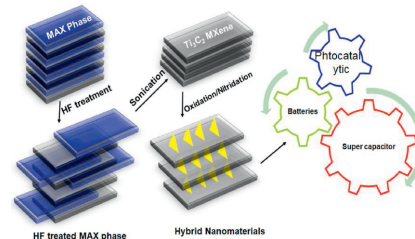
Sen Zhao^a, Ravi Nivetha^a, Yu Qiu^a, Xiaohui Guo^{a,b}

^a Key Lab of Synthetic and Natural Functional Molecule Chemistry of Ministry of Education, and the College of Chemistry and Materials Science, Northwest University, Xi'an 710069, China

^b The State Key Laboratory of Solidification Processing in Northwestern Polytechnique University, Xi'an 710012, China

This review paper is mainly focused on the recent advance concerning the synthesis of two-dimensional hybrid nanomaterials derived from MXene ($\text{Ti}_3\text{C}_2\text{T}_x$) for advanced energy conversion and storage applications.

Chinese Chemical Letters 31 (2020) 947



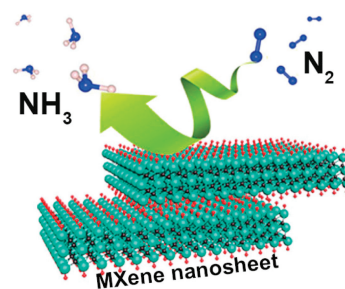
Recent advances of MXene as promising catalysts for electrochemical nitrogen reduction reaction

Jie Sun, Wenhan Kong, Zhaoyong Jin, Yaqian Han, Liangyu Ma, Xiaoteng Ding, Yusheng Niu, Yuanhong Xu

College of Materials Science and Engineering, College of Life Sciences, Qingdao University, Qingdao 266071, China

MXene-based materials were suggested to be promising candidates for electrocatalytic nitrogen reduction due to their exceptional properties.

Chinese Chemical Letters 31 (2020) 953



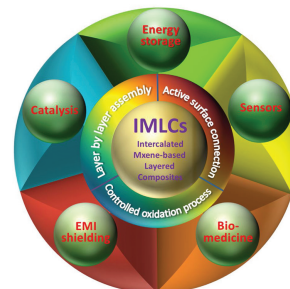
Intercalated MXene-based layered composites: Preparation and application

Shumeng Wu, He Wang, Li Li, Meixia Guo, Zhichong Qi, Qingyou Zhang, Yanmei Zhou

Henan Joint International Research Laboratory of Environmental Pollution Control Materials, College of Chemistry and Chemical Engineering, Henan University, Kaifeng 475004, China

Intercalated MXene-based layered composites have enormous potentials due to their more available active sites, larger interlayer space and synergistic effect of each component. This review summarizes their rapidly-developed preparation strategies and advantages of application in energy storage, catalysis, sensors, electromagnetic interference shielding and biomedicine.

Chinese Chemical Letters 31 (2020) 961



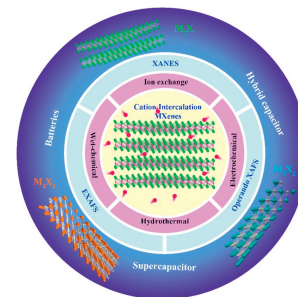
Cation-intercalated engineering and X-ray absorption spectroscopic characterizations of two dimensional MXenes

Changda Wang, Shiqiang Wei, Pengjun Zhang, Kefu Zhu, Pin Song, Shuangming Chen, Li Song

National Synchrotron Radiation Laboratory, CAS Center for Excellence in Nanoscience, University of Science and Technology of China, Hefei 230029, China

This review summarizes the strategies of cation intercalated MXenes, their achievements on energy storage systems, as well as the synchrotron-based X-ray absorption spectroscopic characterizations in recent years.

Chinese Chemical Letters 31 (2020) 969



Communications

From high-yield Ti_3AlCN ceramics to high-quality Ti_3CNT_x MXenes through eliminating Al segregation

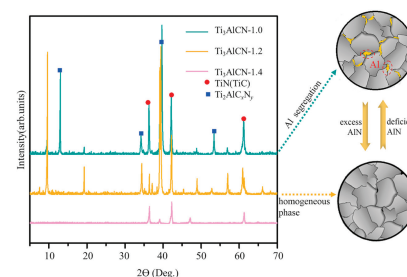
Ningjun Chen^a, Haichao Huang^a, Zhong Xu^a, Yanting Xie^a, Da Xiong^a, Xiang Chu^a, Bingni Gu^a, Bo Zheng^a, Weili Deng^a, Haitao Zhang^a, Weiqing Yang^{a,b}

^a Key Laboratory of Advanced Technologies of Materials, Ministry of Education, School of Materials Science and Engineering, Southwest Jiaotong University, Chengdu 610031, China

^b State Key Laboratory of Traction Power, Southwest Jiaotong University, Chengdu 610031, China

The yield of the quaternary nitrogen-containing Ti_3AlCN ceramics was evidently proved to be up to 70% by the controllable AlN-oversaturation precursor strategy. Such relatively high-yield quaternary Ti_3AlCN is mainly ascribed to the elimination of Al segregation.

Chinese Chemical Letters 31 (2020) 980



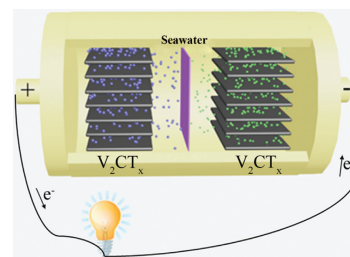
Two-dimensional vanadium carbide (V_2CT_x) MXene as supercapacitor electrode in seawater electrolyte

Hongtian He, Qixun Xia, Bingxin Wang, Libo Wang, Qianku Hu, Aiguo Zhou

School of Materials Science and Engineering, Henan Polytechnic University, Jiaozuo 454000, China

In this work, highly pure V_2CT_x MXene was synthesized by $\text{NaF}+\text{HCl}$ etching. The electrode based on the V_2CT_x MXene for supercapacitors in seawater electrolyte exhibited better performance than other MXenes. It had remarkable volumetric specific capacitances of 317.8 F/cm^3 at 0.2 A/g , and a good cycling stability, i.e., 89.1% capacitance retention after 5000 cycles.

Chinese Chemical Letters 31 (2020) 984



Pt immobilized spontaneously on porous MXene/MAX hybrid monolith for hydrogen evolution reaction

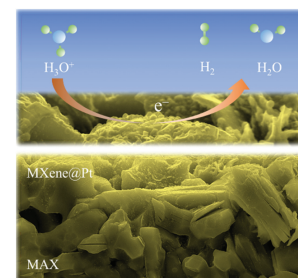
Cong Cui^{a,b}, Renfei Cheng^{a,b}, Chao Zhang^a, Xiaohui Wang^a

^a Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, China

^b School of Materials Science and Engineering, University of Science and Technology of China, Shenyang 110016, China

Pt immobilized spontaneously on porous $\text{Ti}_3\text{C}_2\text{T}_x$ MXene/ Ti_3AlC_2 MAX phase hybrid monolith shows high HER performance even the Pt loadings are as low as $8.9 \mu\text{g/cm}^2$.

Chinese Chemical Letters 31 (2020) 988



Highly efficient catalytic performances of nitro compounds *via* hierarchical PdNPs-loaded MXene/polymer nanocomposites synthesized through electrospinning strategy for wastewater treatment

Juanjuan Yin^{a,b}, Fangke Zhan^b, Tifeng Jiao^{a,b}, Huizhen Deng^b, Guodong Zou^a, Zhenhua Bai^c, Qingrui Zhang^b, Qiuming Peng^a

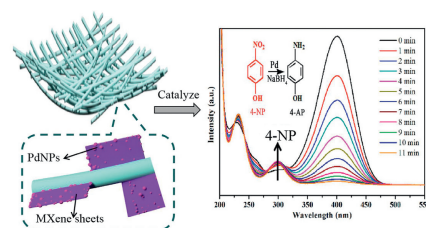
^a State Key Laboratory of Metastable Materials Science and Technology, Yanshan University, Qinhuangdao 066004, China

^b Hebei Key Laboratory of Applied Chemistry, School of Environmental and Chemical Engineering, Yanshan University, Qinhuangdao 066004, China

^c National Engineering Research Center for Equipment and Technology of Cold Strip Rolling, Yanshan University, Qinhuangdao 066004, China

Novel PVA/PAA/MXene/PdNPs composite nanofiber membrane by electrospinning was prepared, exhibiting excellent catalytic ability and cycle stability for 4-NP and 2-NA in field of wastewater treatment.

Chinese Chemical Letters 31 (2020) 992



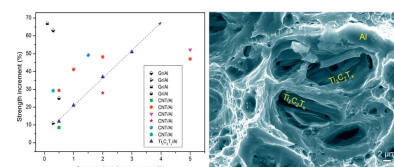
Mechanical properties and frictional resistance of Al composites reinforced with $\text{Ti}_3\text{C}_2\text{T}_x$ MXene

Jie Hu, Shibo Li, Jing Zhang, Qiuying Chang, Wenbo Yu, Yang Zhou

School of Mechanical and Electronic Control Engineering, Beijing Jiaotong University, Beijing 100044, China

$\text{Ti}_3\text{C}_2\text{T}_x$ reinforced Al matrix composites exhibit improved mechanical and frictional properties due to the homogeneous distribution of $\text{Ti}_3\text{C}_2\text{T}_x$ and the formation of strong bonding interfaces in the composites.

Chinese Chemical Letters 31 (2020) 996



Nanostructured $\text{Ni}/\text{Ti}_3\text{C}_2\text{T}_x$ MXene hybrid as cathode for lithium-oxygen battery

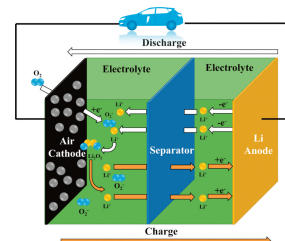
Caiying Wen^a, Tianjiao Zhu^a, Xingyu Li^a, Huifeng Li^a, Xianqiang Huang^b, Genban Sun^a

^a Beijing Key Laboratory of Energy Conversion and Storage Materials, College of Chemistry, Beijing Normal University, Beijing 100875, China

^b Shandong Provincial Key Laboratory of Chemical Energy Storage and Novel Cell Technology, School of Chemistry & Chemical Engineering, Liaocheng University, Liaocheng 252059, China

$\text{Ni}/\text{Ti}_3\text{C}_2\text{T}_x$ MXene hybrid is used as cathode material of lithium-oxygen battery, which shows good cycle and specific capacity performance.

Chinese Chemical Letters 31 (2020) 1000



Porous and free-standing $\text{Ti}_3\text{C}_2\text{T}_x$ -RGO film with ultrahigh gravimetric capacitance for supercapacitors

Yongzheng Fang^a, Bowen Yang^a, Dongtong He^a, Huipeng Li^a, Kai Zhu^{a,c}, Lin Wu^b, Ke Ye^a, Kui Cheng^a, Jun Yan^a, Guiling Wang^a, Dianxue Cao^a

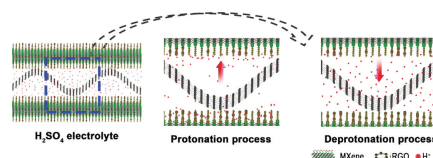
^a Key Laboratory of Superlight Materials and Surface Technology, Ministry of Education, College of Material Science and Chemical Engineering, Harbin Engineering University, Harbin 150001, China

^b Teachers Education College of Harbin Normal University, Harbin 150001, China

^c Key Laboratory of Advanced Chemical Power Sources, Guizhou Meiling Power Sources Co., Ltd., Zunyi 563003, China

The cross-linked porous $\text{Ti}_3\text{C}_2\text{T}_x$ -RGO film was designed and synthesized by the micro-explosion reaction. Such a flexible and freestanding $\text{Ti}_3\text{C}_2\text{T}_x$ -RGO electrode presented an ultrahigh capacitance and remarkable rate performance, which is less effect by mass loading.

Chinese Chemical Letters 31 (2020) 1004



Accordion-like titanium carbide (MXene) with high crystallinity as fast intercalative anode for high-rate lithium-ion capacitors

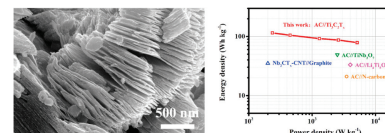
Chen Li^a, Xiong Zhang^{a,b}, Kai Wang^a, Xianzhong Sun^a, Yanwei Ma^{a,b}

^a Institute of Electrical Engineering, Chinese Academy of Sciences, Beijing 100190, China

^b School of Engineering Sciences, University of Chinese Academy of Sciences, Beijing 100049, China

A simple method involving combustion synthesis and acid treatment to prepare accordion-like $\text{Ti}_3\text{C}_2\text{T}_x$ MXene with open structure and high crystallinity. The $\text{Ti}_3\text{C}_2\text{T}_x$ -based lithium-ion capacitor provides a maximum energy density of 106 Wh/kg and power density of 5.2 kW/kg.

Chinese Chemical Letters 31 (2020) 1009



Robust and easily retrievable $\text{Pd}/\text{Ti}_3\text{C}_2\text{T}_x/\text{c}$ graphene hydrogels for efficient catalytic hydrogenation of nitroaromatic compounds

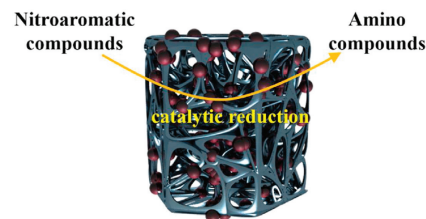
Xiuqiang Xie^a, Zhenjun Wu^b, Nan Zhang^a

^a College of Materials Science and Engineering, Hunan University, Changsha 410082, China

^b College of Chemistry and Chemical Engineering, Hunan University, Changsha 410082, China

$\text{Pd}/\text{Ti}_3\text{C}_2\text{T}_x/\text{c}$ graphene hydrogels have been prepared as robust and easily retrievable catalysts for efficient hydrogenation of nitroaromatic compounds.

Chinese Chemical Letters 31 (2020) 1014



$\text{Ti}_3\text{C}_2\text{T}_x/\text{PEDOT:PSS}$ hybrid materials for room-temperature methanol sensor

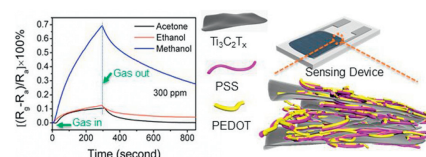
Xiaofeng Wang^{a,b}, Kaiming Sun^b, Ke Li^a, Xu Li^b, Yury Gogotsi^a

^a A. J. Drexel Nanomaterials Institute and Department of Materials Science and Engineering, Drexel University, Philadelphia, PA 19104, United States

^b School of Mathematics and Physics Science, Dalian University of Technology, Panjin 124221, China

A blend of PEDOT:PSS and $\text{Ti}_3\text{C}_2\text{T}_x$ with the mass ratio of 4:1 is developed to fabricate a methanol gas sensor with a high response ratio of the largest response and the second largest response 5.54 and improvement of response compared to pure PEDOT:PSS and pure $\text{Ti}_3\text{C}_2\text{T}_x$ tested at room temperature.

Chinese Chemical Letters 31 (2020) 1018



Ternary $\text{BiOBr}/\text{TiO}_2/\text{Ti}_3\text{C}_2\text{T}_x$ MXene nanocomposites with heterojunction structure and improved photocatalysis performance

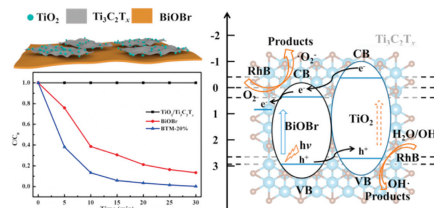
Tianxiang Xu^{a,b}, Jiawei Wang^{a,b}, Ye Cong^{a,b}, Song Jiang^b, Qin Zhang^b, Hui Zhu^b, Yanjun Li^b, Xuanke Li^a

^a The State Key Laboratory of Refractories and Metallurgy, Wuhan University of Science and Technology, Wuhan 430081, China

^b Hubei Province Key Laboratory of Coal Conversion and New Carbon Materials, Wuhan University of Science and Technology, Wuhan 430081, China

A series of ternary $\text{BiOBr}/\text{TiO}_2/\text{Ti}_3\text{C}_2\text{T}_x$ MXene nanocomposites were designed and constructed as photocatalysts by a facile one-step hydrothermal procedure. The composites presented outstanding visible-light photocatalytic activity due to the optimized synergetic effects of BiOBr , TiO_2 and $\text{Ti}_3\text{C}_2\text{T}_x$ MXene.

Chinese Chemical Letters 31 (2020) 1022



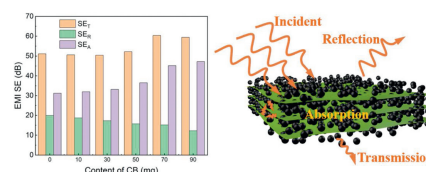
Electromagnetic interference shielding $\text{Ti}_3\text{C}_2\text{T}_x$ -bonded carbon black films with enhanced absorption performance

Xiaomeng Fan, Minghang Li, Xin Li, Fang Ye, Jimei Xue, Litong Zhang, Laifei Cheng

Science and Technology on Thermostructural Composite Materials Laboratory, Northwestern Polytechnical University, Xi'an 710072, China

The flexible and lightweight $\text{Ti}_3\text{C}_2\text{T}_x$ /carbon black (CB) films with high EMI shielding performance were prepared by vacuum assisted filtration. The absorption ability of the film is enhanced with the increase of CB content due to the enhanced scattering and reflection causing by the porous structure.

Chinese Chemical Letters 31 (2020) 1026



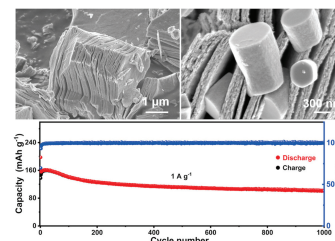
Facile hydrothermal construction of $\text{Nb}_2\text{CT}_x/\text{Nb}_2\text{O}_5$ as a hybrid anode material for high-performance Li-ion batteries

Li Qin, Senyang Xu, Yang Liu, Shuhao Zhu, Linrui Hou, Changzhou Yuan

School of Material Science & Engineering, University of Jinan, Ji'nan 250022, China

Hybrid $\text{Nb}_2\text{CT}_x/\text{Nb}_2\text{O}_5$ derived from niobium-based MXene was synthesized by one-step hydrothermal strategy, and exhibited remarkable lithium-storage properties for Li-ion batteries as competitive anodes.

Chinese Chemical Letters 31 (2020) 1030



Additive-free porous assemblies of $\text{Ti}_3\text{C}_2\text{T}_x$ by freeze-drying for high performance supercapacitors

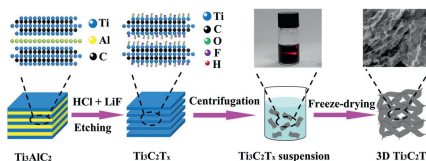
Yue Yang^a, Lili Wu^{a,b}, Lu Li^a, Shuangyan Lin^a, Lina Bai^a, Xinzhi Ma^a, Zhitao Shao^a, Xitian Zhang^a

^a Key Laboratory for Photonic and Electronic Bandgap Materials, Ministry of Education, School of Physics and Electronic Engineering, Harbin Normal University, Harbin 150025, China

^b Center for Engineering Training and Basic Experimentation, Heilongjiang University of Science and Technology, Harbin 150022, China

Porous $\text{Ti}_3\text{C}_2\text{T}_x$ assemblies were rationally designed and synthesized by introducing ice as spacers with a facile freeze-drying method. They are promising candidates for electrochemical energy storage devices.

Chinese Chemical Letters 31 (2020) 1034



Achieving high yield of $\text{Ti}_3\text{C}_2\text{T}_x$ MXene few-layer flakes with enhanced pseudocapacitor performance by decreasing precursor size

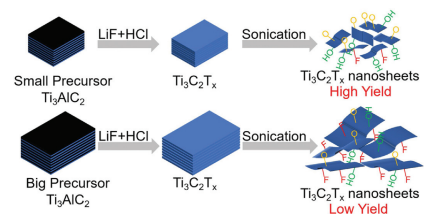
Jianguang Xu^a, Jiale Zhu^{a,b}, Chen Gong^{a,b}, Zexin Guan^a, Dan Yang^a, Zhihan Shen^a, Wei Yao^a, Haijiang Wu^b

^a School of Materials Science and Engineering, Yancheng Institute of Technology, Yancheng 224051, China

^b Key Laboratory of Hunan Province for Efficient Power System and Intelligent Manufacturing, Shaoyang University, Shaoyang 422000, China

High yield of 65% few-layer $\text{Ti}_3\text{C}_2\text{T}_x$ flakes was achieved when using the small 500 mesh Ti_3AlC_2 powders as precursor. These small flakes exhibit an enhanced pseudocapacitor performance owing to their excellent electrical conductivity, expanded interlayer space and more O content on the surface.

Chinese Chemical Letters 31 (2020) 1039



Scalable construction of SiO/wrinkled MXene composite by a simple electrostatic self-assembly strategy as anode for high-energy lithium-ion batteries

Chuanliang Wei, Huifang Fei, Yuan Tian, Yongling An, Yuan Tao, Yuan Li, Jinkui Feng

Research Center for Carbon Nanomaterials, Key Laboratory for Liquid-Solid Structural Evolution & Processing of Materials (Ministry of Education), School of Materials Science and Engineering, Shandong University, Ji'nan, 250061 China

SiO/wrinkled MXene composite is fabricated by a scalable and simple electrostatic selfassembly method. When used as anode for lithium-ion batteries, the composite exhibits excellent electrochemical performance.

Chinese Chemical Letters 31 (2020) 1044

