

三维大孔-/介孔碳-碳化钛复合材料用于无枝晶锂金属负极

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Three-Dimensional Macro-/Mesoporous C-TiC Nanocomposites for Dendrite-Free Lithium Metal Anode

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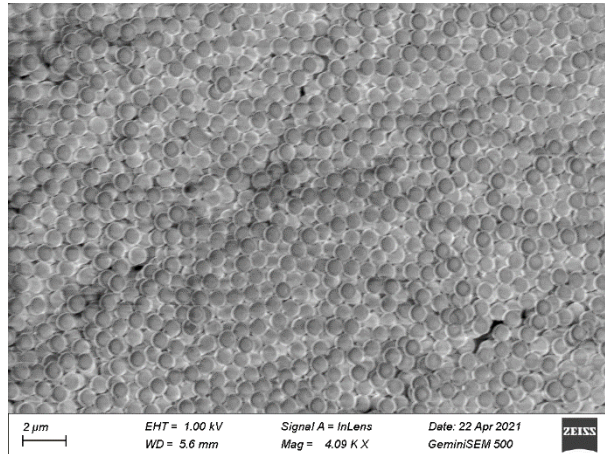


图 S1 聚苯乙烯微球的 SEM 图

Fig. S1 The SEM image of the polystyrene microsphere.

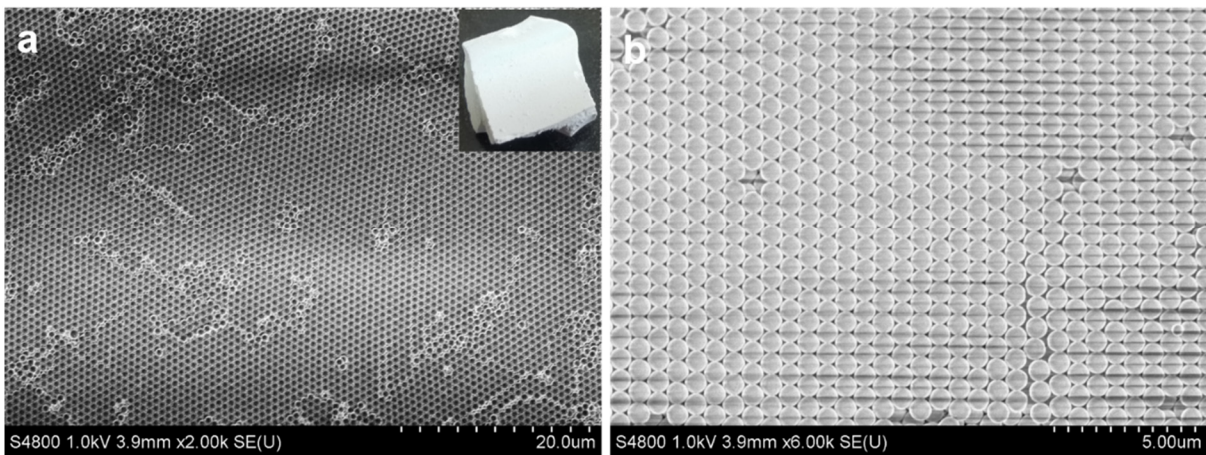


图 S2 聚苯乙烯微球光子晶体的 SEM 图(a-b)

Fig. S2 SEM images (a-b) of polystyrene colloidal photonic crystals.

The inset in (a) is the corresponding optical image.

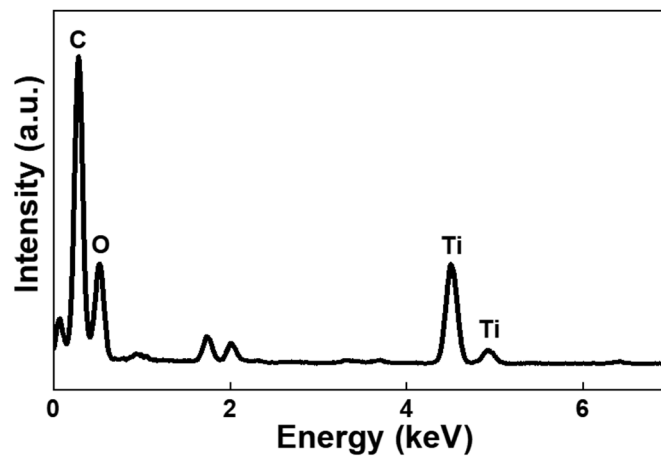


图 S3 三维大孔-/介孔碳化钛的能量色散 X 射线谱图

Fig. S3 The energy-dispersive X-ray spectrum of the three-dimensional macroporous-/mesoporous C-TiC (3DMM C-TiC).

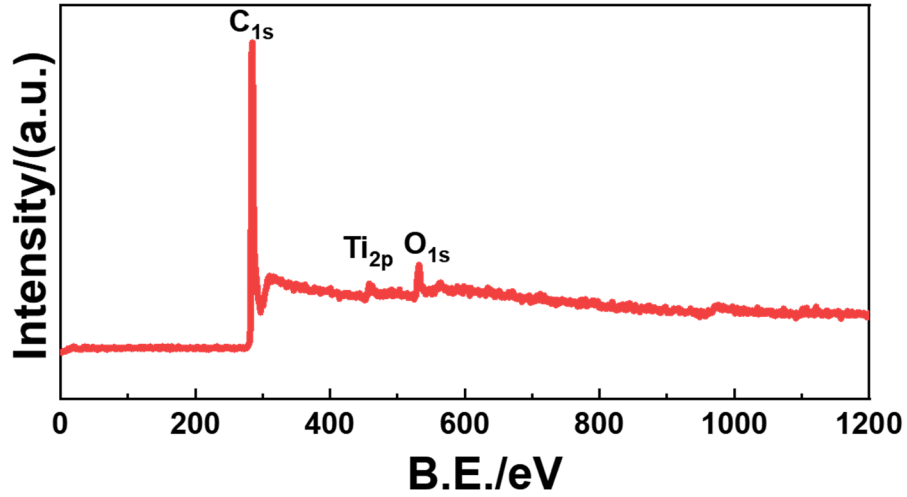


图 S4 三维大孔-/介孔碳-碳化钛材料的 XPS 全谱
Fig. S4 The XPS surgery spectrum of the 3DMM C-TiC.

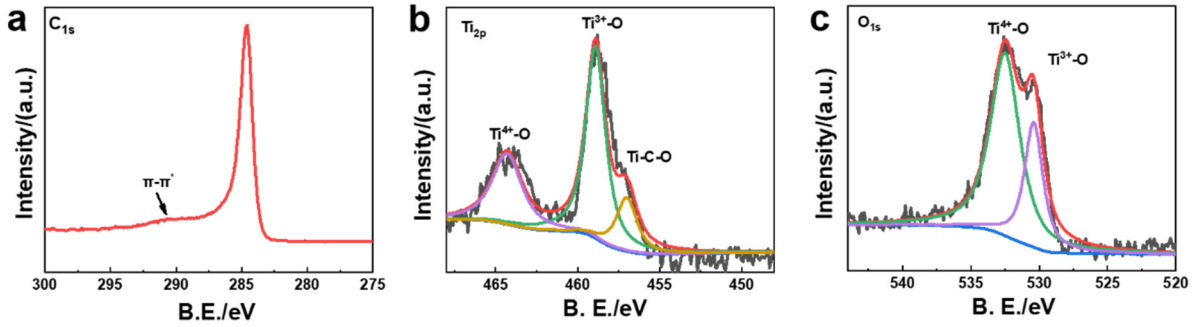


图 S5 三维大孔-/介孔碳-碳化钛材料的高分辨碳谱(a), 钛谱(b)和氧谱(c)
Fig. S5 High resolution XPS spectra of C 1s (a), Ti 2p (b) and O 1s (c) for 3DMM C-TiC.

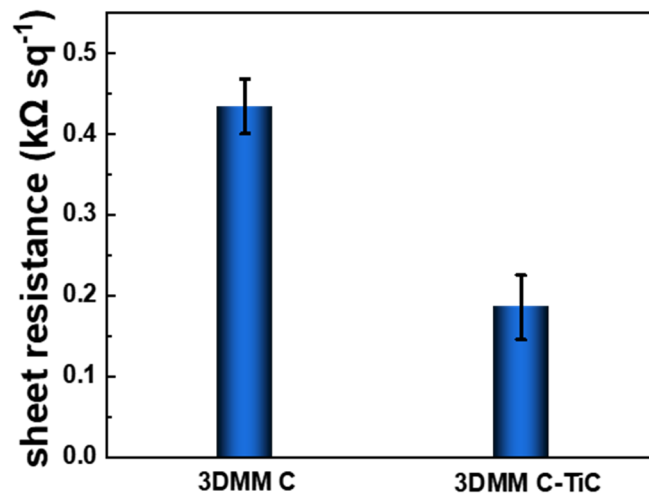


图 S6 三维大孔-/介孔碳-碳化钛和三维大孔-/介孔碳的面电阻
Fig. S6 The sheet resistances of the three-dimensional macro-/mesoporous C (3DMM C) and 3DMM C-TiC.

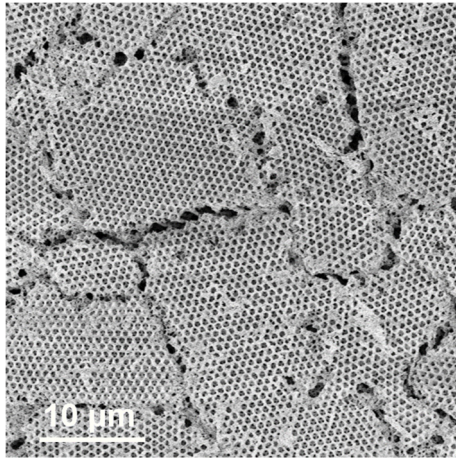


图 S7 三维大孔-/介孔碳材料的 SEM 图
Fig. S7 The SEM image of the 3DMM C.

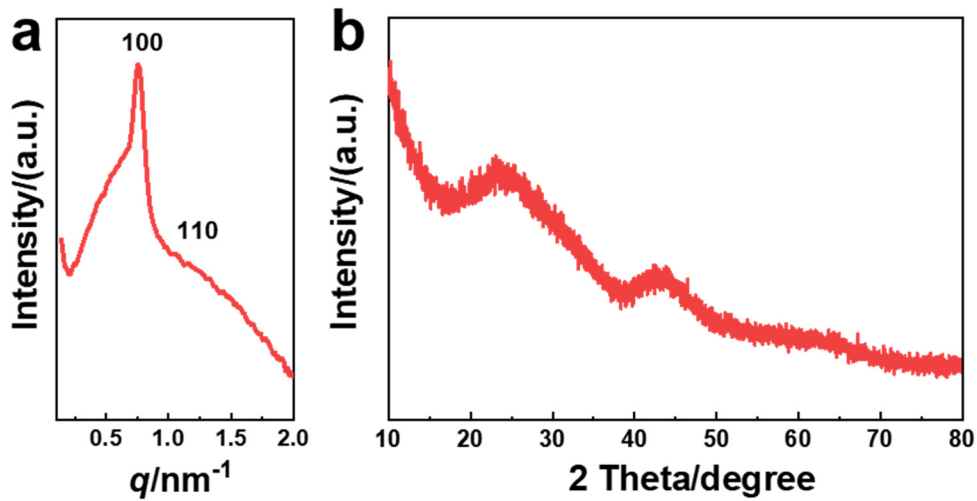


图 S8 三维大孔-/介孔碳材料的 SAXS (a)和 XRD (b)图
Fig. S8 SAXS (a) and XRD (b) patterns of 3DMM C.

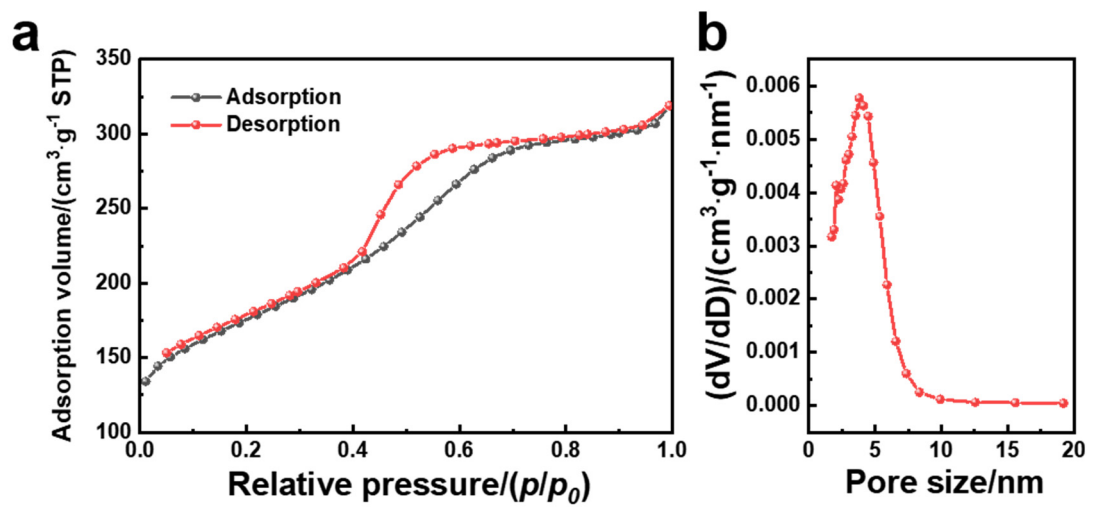


图 S9 三维大孔-/介孔碳材料的氮气吸脱附等温线(a)和对应的孔径分布(b)图
Fig. S9 The nitrogen adsorption-desorption isotherm (a) and the corresponding pore size distribution curve (b) of the 3DMM C.

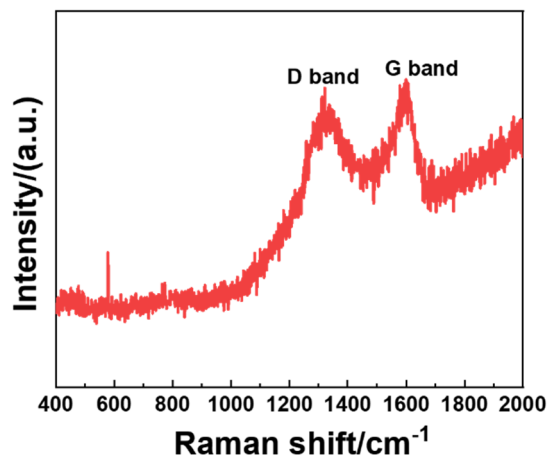


图 S10 三维大孔-/介孔碳材料的拉曼图
Fig. S10 The Raman spectrum of 3DMM C.

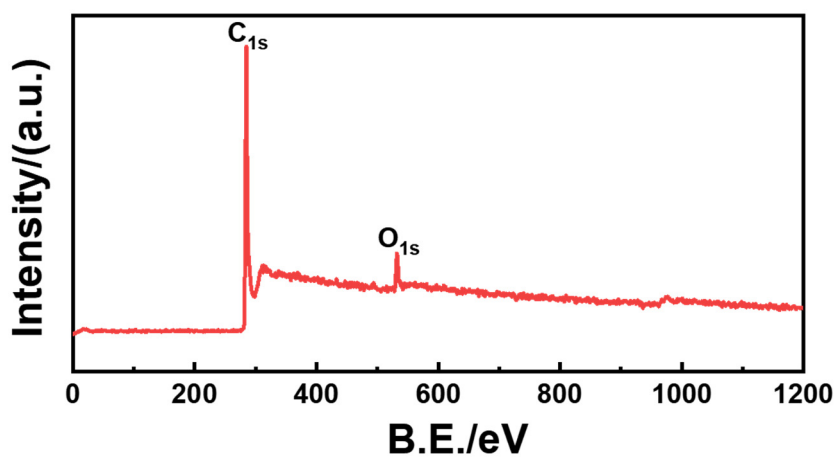


图 S11 三维大孔-/介孔碳材料的 XPS 全谱
Fig. S11 The XPS survey spectrum of 3DMM C.

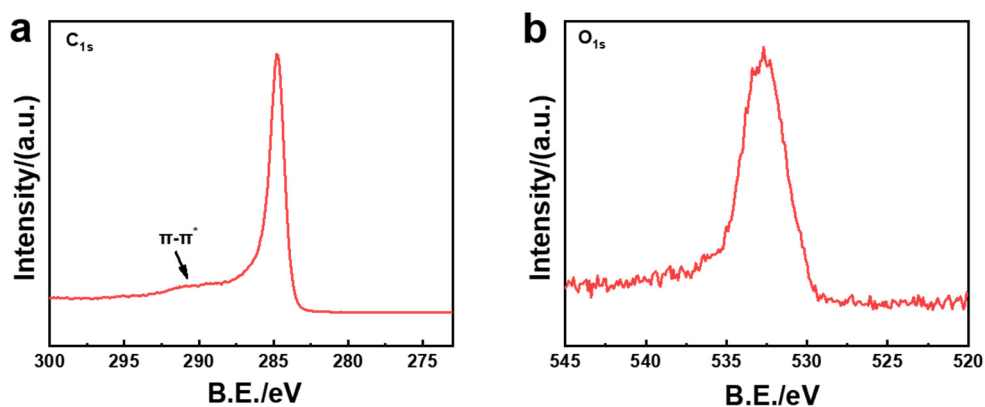


图 S12 三维大孔-/介孔碳的高分辨碳谱(a)和氧谱(b)
Fig. S12 High resolution XPS spectra of C 1s (a) and O 1s (b) for 3DMM C.

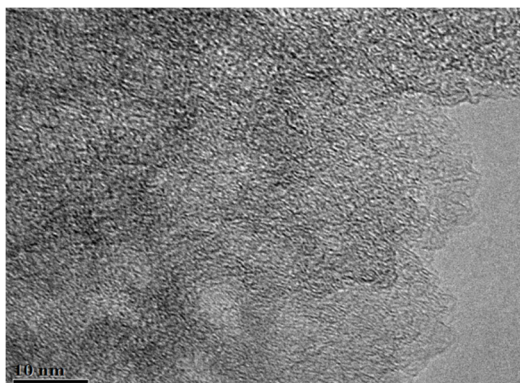


图 S13 三维大孔-/介孔碳的高分辨透射电镜图

Fig. S13 The HRTEM image of C 1s (a) and O 1s (b) for 3DMM C.

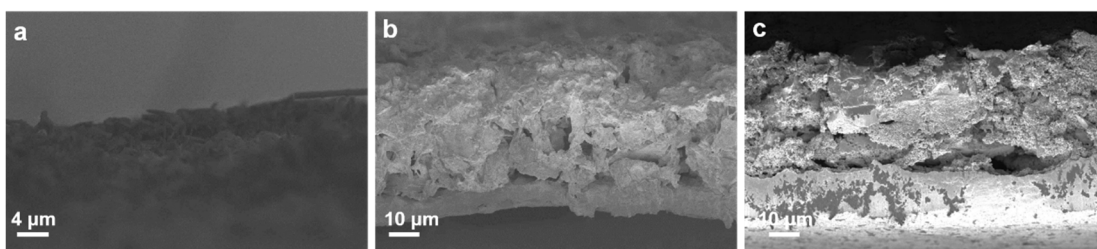


图 S14 铜箔(a), 三维大孔-/介孔碳(b)和三维大孔-/介孔碳-碳化钛(c)在 $0.5 \text{ mA}\cdot\text{cm}^{-2}$ 的电流密度下沉积 $1 \text{ mAh}\cdot\text{cm}^{-2}$ 后的截面 SEM 图

Fig. S14 Cross-sectional SEM images of the Cu foil (a), 3DMM C (b) and 3DMM C-TiC (c) after Li plating with the capacity of $1.0 \text{ mAh}\cdot\text{cm}^{-2}$ at the current density of $0.5 \text{ mA}\cdot\text{cm}^{-2}$.

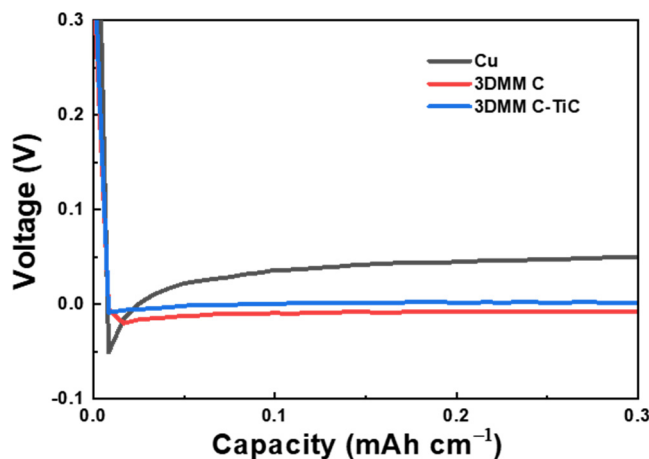


图 S15 铜箔(a), 三维大孔-/介孔碳(b)和三维大孔-/介孔碳-碳化钛(c)在恒电流锂沉积下的电压曲线

Fig. S15 Voltage profiles of galvanostatic Li deposition on the Cu foil, 3DMM C and 3DMM C-TiC (c).

表 S1 元素分布谱图测得的三维大孔-/介孔碳-碳化钛复合材料中的元素质量含量

Table S1 The elemental content of the 3DMM C-TiC.

	C	Ti	O
质量分数	67.65	16.36	15.98
原子分数	80.78	4.90	14.33

表 S2 三维大孔-/介孔碳和三维大孔-/介孔碳-碳化钛复合材料的物理化学性质

Table S2 Physical properties of 3DMM C and 3DMM C-TiC.

样品	晶胞参数(nm)	比表面积(m ² ·g ⁻¹)	孔径(nm)
3DMM C-TiC	~9.3	510	4.9
3DMM C	~8.4	608	3.8