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Further surface modification by carbon coating for *in-situ* growth of Fe₃O₄ nanoparticles on MXene Ti₃C₂ multilayers for advanced Li-ion storage

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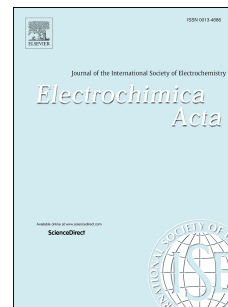
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1 **Further surface modification by carbon coating for *in-situ* growth of**
2 **Fe₃O₄ nanoparticles on MXene Ti₃C₂ multilayers for advanced Li-ion**
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9 **Abstract:** Herein, a new nanocomposite was synthesized *via in-situ* growth of Fe₃O₄
10 nanoparticles on MXene Ti₃C₂ multilayer to improve the electrochemical performance
11 of anodes by integrating the merits of transition metal oxide and Ti₃C₂, where further
12 surface modification of Fe₃O₄@Ti₃C₂ nanocomposites by carbon coating was
13 introduced here. The nanocomposites exhibited excellent electrochemical
14 performance in Li-ion storage when used as the anode materials, which benefited
15 from the combination of the high capacity of magnetite and favorable electrical
16 conductivity of Ti₃C₂. The optimized Fe₃O₄@Ti₃C₂-2.5 (a mass ratio of 1.1) showed a
17 high reversible capacity of 342.9 mAh·g⁻¹ at 1C, which exceeded the theoretical
18 capacity of bare Ti₃C₂ monolayer (320 mAh·g⁻¹), and an impressive rate reversibility.
19 TEM presented that the carbon layers were homogeneously coated on the surface of
20 nanocomposites with a thickness of approximately 1 nm. The
21 electrochemical measurement showed that C-coated Fe₃O₄@Ti₃C₂-2.5 presented

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