Improved Performance of $LiFe_{0.25}Mn_{0.75}PO_4$ by using Graphene and Fluorine-Doped Carbon Coating

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Lithium transition metal phosphatesusually need modification of morphology and electron conductivity for improving the electrochemical performance [1,2]. In this work, the electron conductivity of $LiFe_{0.25}Mn_{0.75}PO_4$ is increased by adopting graphene and F-doped carbon.The reductive graphene oxide and F-doped carbon coating $LiFe_{0.25}Mn_{0.75}PO_4$ (LFMP/C-F/rGO) is synthesized by a simple ball milling method. The results demonstrated that the composite materials exhibit excellent rate performance and good cycling stability especially at high rate. The LFMP/C-F/rGO presents discharge specific capacities of 166.7 and 125.6 mAh g^{-1} at 0.1 and 20 C (1C=170 mA g-1) current density, respectively. In addition, the capacity of LMFP/C-F/rGO can remain 85% of the original capacity at 10 C after 800 cycles. In the coming conference, other progress on LMFP in our group will be presented.

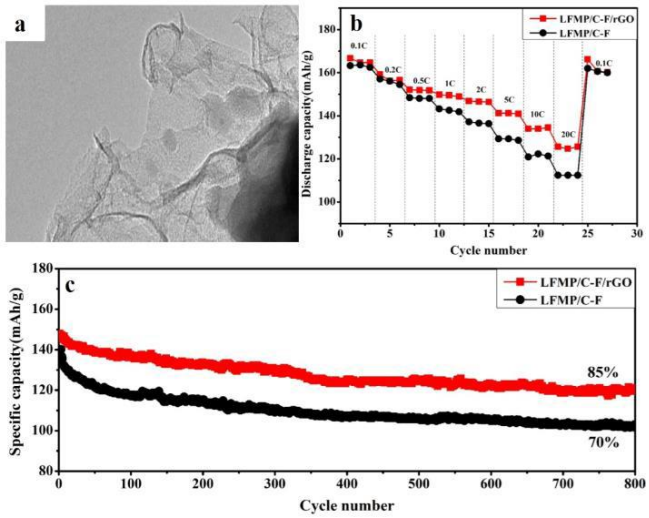

Fig.8 (a) TEM images of LFMP/C-F/rGOc omposite materials, (b) comparisons of different rate capability of LFMP/C-F/rGO, (c) cycling performances of LFMP/C-F/rGO and LFMP/C-F cathode material at 10C at room temperature.

[1] Yan Xand Sun D, Wang Y, Zhang Z, Yan W, Jiang J, Ma F,Liu J, JinY*, Kanamura K*, ACS Sustainable Chemistry & Engineering, 2017, 5, 4637−4644

[2] Wang B, Xu B, Liu T, Liu P, Guo C, Wang S, et al. Nanoscale. 2014,6,986-95