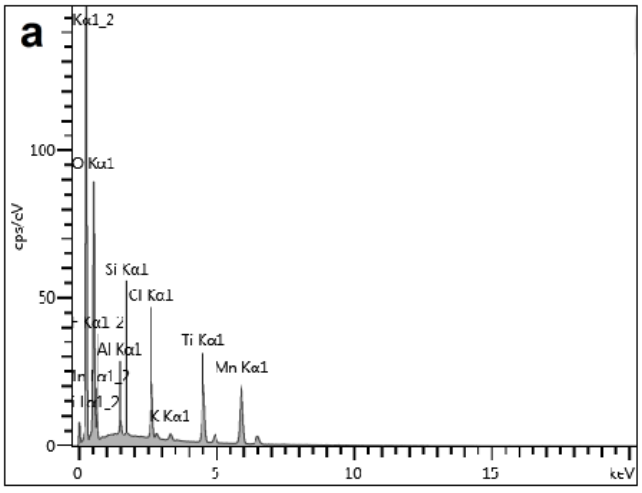
Electrochemical performance of two-dimensional Ti_3C_2-Mn_3O_4 nanocomposites and carbonized iron cations for hybrid supercapacitor electrodes

Kabir O. Oyedotun[1], Damilola Y. Momodu[1], Michael Naguib[2], Abdulmajid A. Mirghni[1], Tshifhiwa M. Masikhwa[1], Abubakar A. Khaleed[1], Mesfin Kebede[3], and Ncholu Manyala[1]*

[1]Department of Physics, Institute of Applied Materials, SARCHI Chair in Carbon Technology and Materials, University of Pretoria, Pretoria 0028, South Africa.
[2]Department of Physics and Engineering Physics, Tulane University, New Orleans, LA 70118, USA.
[3]Energy Materials, Materials Science and Manufacturing, Council for Scientific and Industrial Research (CSIR), Pretoria, 0001, South Africa
*Corresponding author's email: ncholu.manyala@up.ac.za, Tel.: + (27)12 420 3549.

SUPPORTING INFORMATION



b

Element	Line Type	Apparent Concentration	k Ratio	Wt%	Wt% Sigma	Standard Label
C	K series	19.61	0.19609	39.63	0.16	C Vit
O	K series	21.19	0.07132	17.40	0.10	SiO_2
F	K series	1.85	0.00362	1.07	0.05	CaF_2
Al	K series	0.58	0.00413	0.65	0.02	Al_2O_3
Si	K series	0.14	0.00115	0.17	0.02	SiO_2
Cl	K series	3.81	0.03333	4.61	0.05	NaCl
K	K series	0.56	0.00473	0.64	0.03	KBr
Ti	K series	8.61	0.08610	12.07	0.09	Ti
Mn	K series	15.73	0.15730	23.75	0.14	Mn
Total:				100.00		

Fig. S1. (a) EDX spectrum, and (b) table of chemical analysis of Ti_3C_2-Mn_3O_4 nanocomposite respectively.

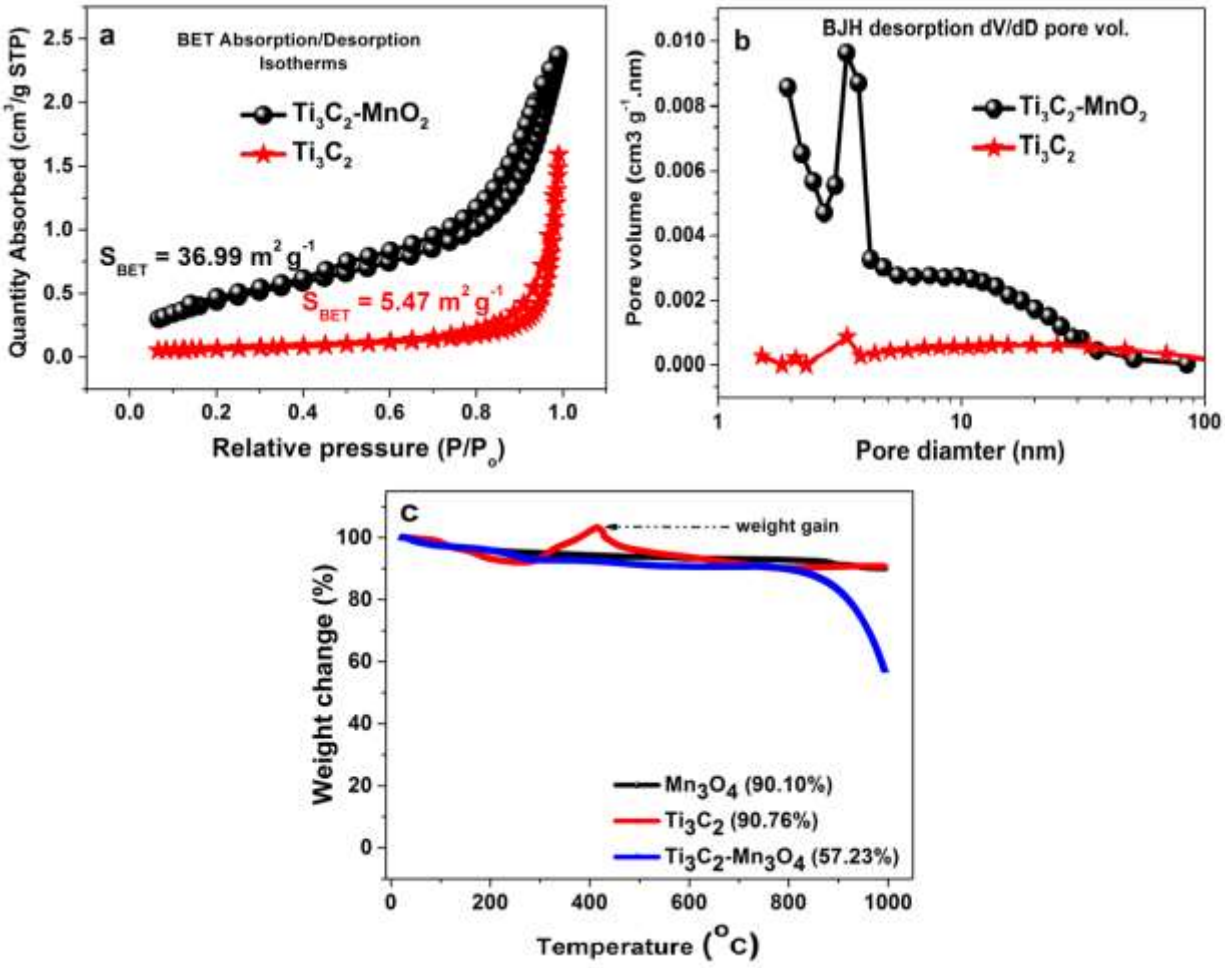


Fig. S2. (a) N_2 isotherms and (b) pore size distribution of Ti_3C_2-Mn_3O_4, and (c) Thermogravimetric analysis curves of Ti_3C_2, Mn_3O_4 and Ti_3C_2-Mn_3O_4 nanocomposite.

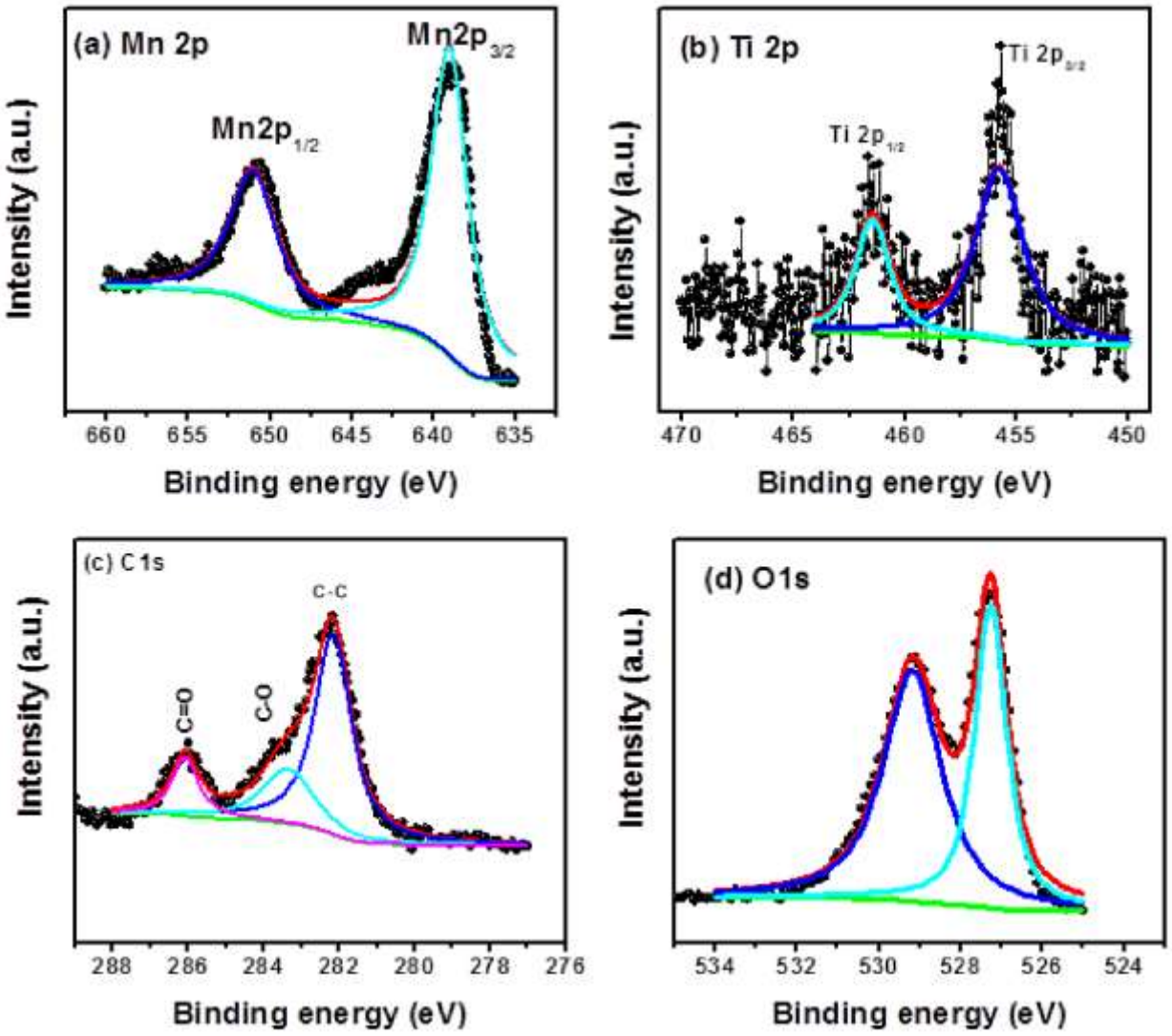


Fig. S3. The core level spectrum of (a) Mn 2p, (b) Ti 2p, (c) C 1s and (d) O 1s of a Ti_3C_2-Mn_3O_4 nanocomposite, respectively.

Table S1: Showing XRF analysis of as-synthesized Ti_2C_3-Mn_3O_4 nanocomposite.

Compound	**Weight %**
Al_2O_3	2.41
K_2O	0.80
Na_2O	0.67
MgO	0.23
Sm_2O_3	0.13
Tb_4O_7	0.10
SiO_2	0.07
V_2O_5	0.05
Gd_2O_3	0.03
Cl	0.03
Co_3O_4	0.03
CaO	0.02
P	0.02
Au	0.01
MoO_3	0.01
La_2O_3	0.01
PtO_2	0.01
% Mn_3O_4	79.83
Remaining % Ti_3C_2	15.56
TOTAL	**100.00**