Electronic Supplementary Material (ESI) for RSC Advances.

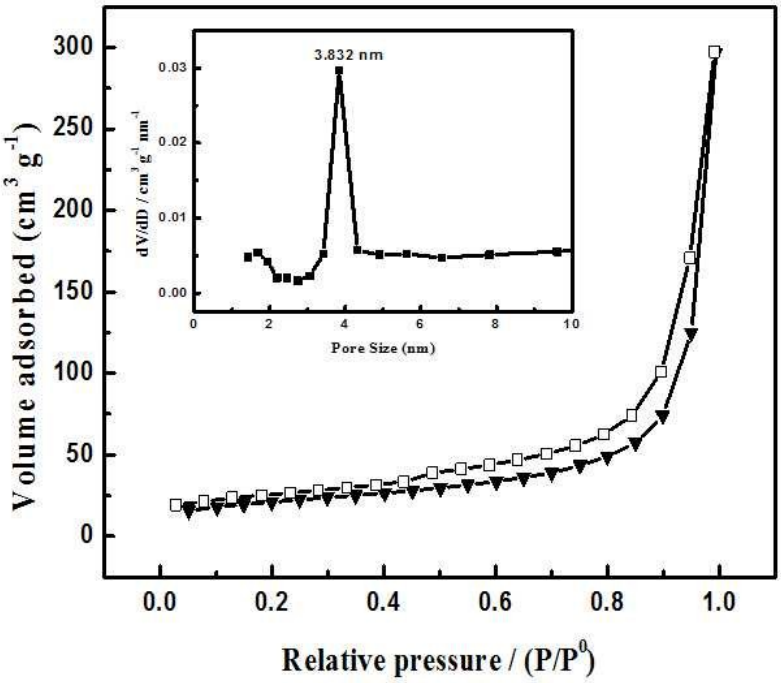

Fig.S1 N_2 adsorption-desorption isotherm at 77k of the as-formed "desert rose"-like structure MnO_2 and the inset shows the corresponding pore size distribution calculated by the BJH method from the desorption branch of the isotherm.

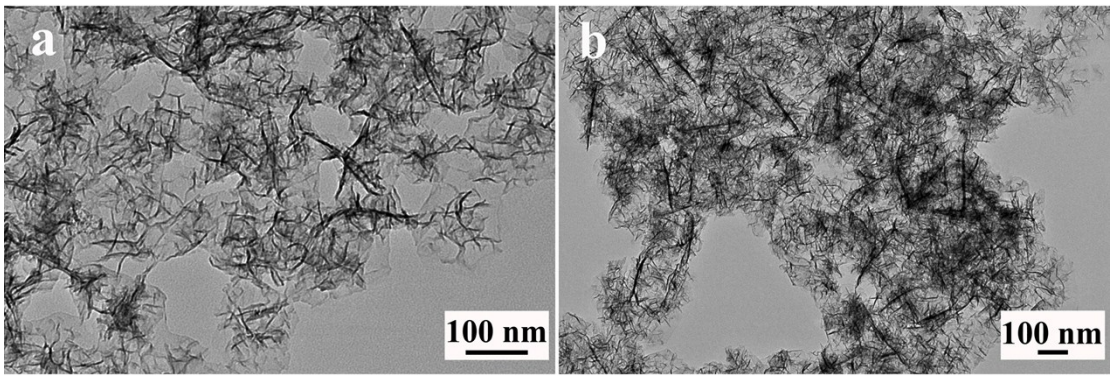

Fig. S2. TEM images of Bir-MnO_2 samples obtained after different reaction durations (a) 4h and (b) 8h respectively.

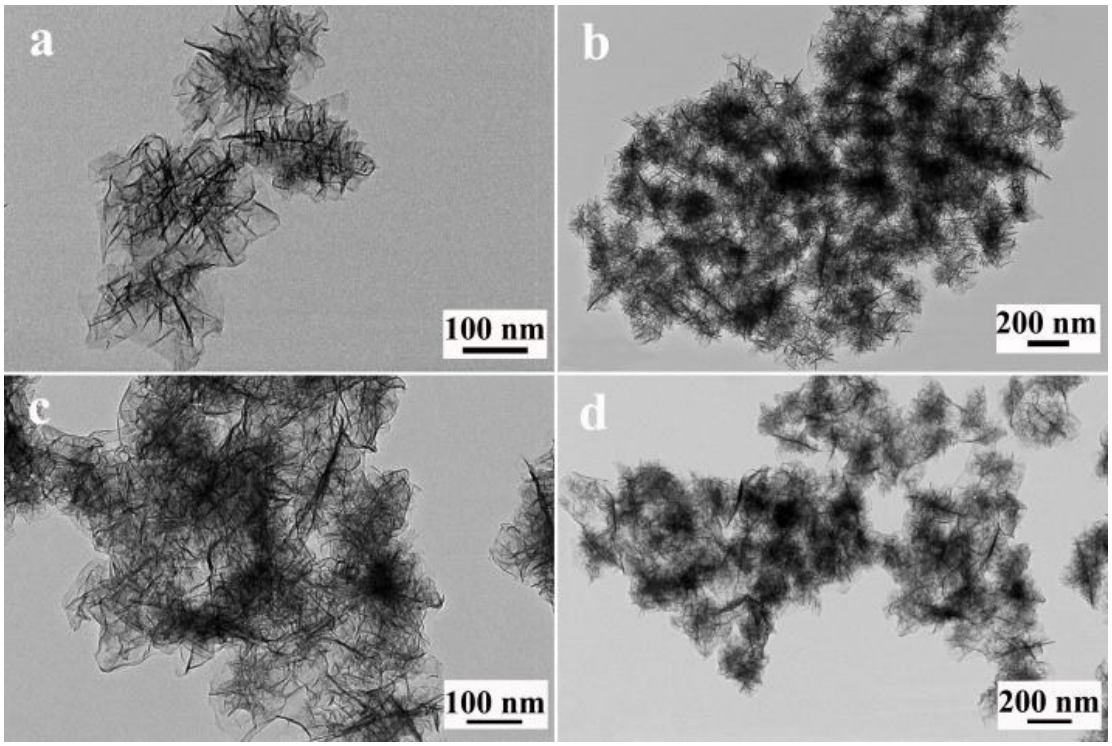

Fig.S3 TEM images with different magnifications of Bir-MnO_2 samples obtained with different optical sources: (a,b) visible light (fluorescent lamp) and (c,d) indoor light.

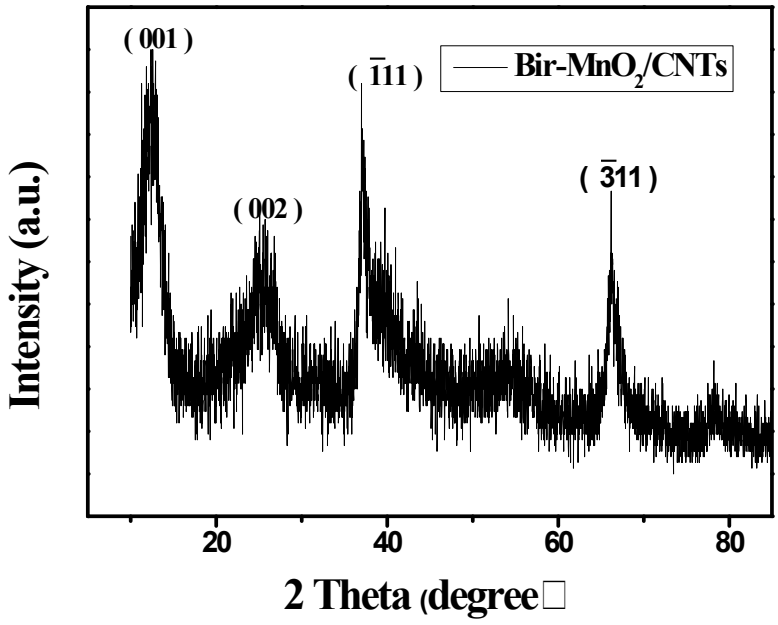

Fig.S4 XRD patterns of Bir-MnO_2/CNTs nanocomposites.

Table S1. The composition of Bir-MnO_2 assembled hierarchical nanostructure evaluated by EDX spectroscopy.

elemental	Weight percentage(%)	Atomic percentage(%)
O	45.77	73.59
K	5.35	3.52
Mn	48.88	22.89
Total amount	100.00	100.00

Table S2. BET surface areas and BJH pore volumes of Bir-MnO_2 assembled hierarchical nanostructure.

sample	Surface area (m^2g^{-1})	Pore size (nm)	Pore volume(cm^3g^{-1})
MnO_2 nanosheets	85.138	3.832	2.018