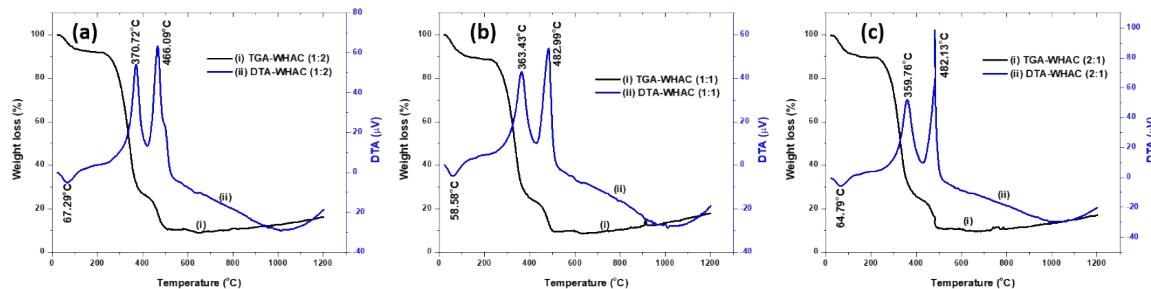
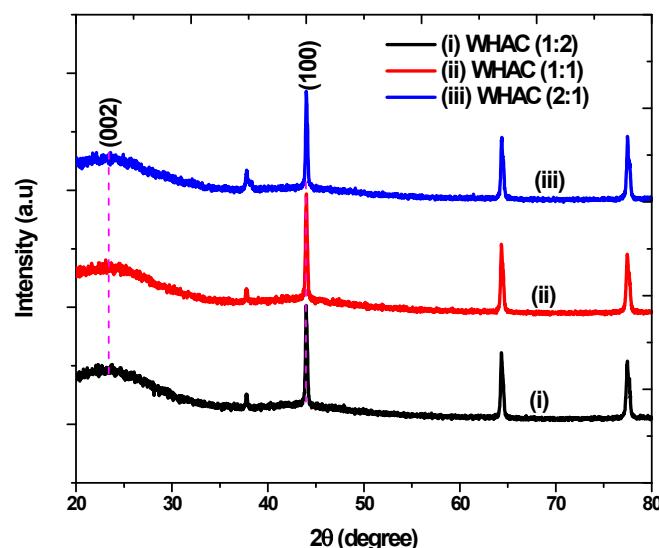


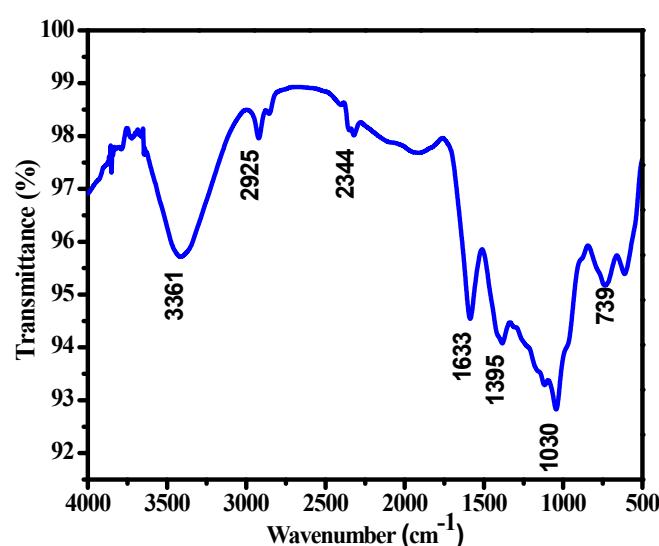
## Supplementary materials



**Fig. S1.** TGA-DTA thermograms of (a) WHAC (1:2), (b) WHAC (1:1), and (c) WHAC (2:1).



**Fig. S2.** XRD patterns of (i) WHAC (1:2), (ii) WHAC (1:1), and (iii) WHAC (2:1).



**Fig. S3.** XRD patterns of (i) WHAC (1:2), (ii) WHAC (1:1), and (iii) WHAC (2:1).

**Table S1.** Summary of average crystalline size for all prepared samples.

Sample	Average crystalline size (nm)
WHAC(1:2)	21.40
WHAC (1:1)	21.64
WHAC (2:1)	21.11
MnO <sub>2</sub> (1:3)	7.00
MnO <sub>2</sub> (1:1)	5.14
MnO <sub>2</sub> (3:1)	5.77
Fe <sub>3</sub> O <sub>4</sub> (1:10)	8.10
Fe <sub>3</sub> O <sub>4</sub> (1:1)	12.6
Fe <sub>3</sub> O <sub>4</sub> (10:1)	9.80
MnO <sub>2</sub> / Fe <sub>3</sub> O <sub>4</sub> (1:2)	9.10
MnO <sub>2</sub> / Fe <sub>3</sub> O <sub>4</sub> (1:1)	8.30
MnO <sub>2</sub> / Fe <sub>3</sub> O <sub>4</sub> (2:1)	13.50
MnO <sub>2</sub> / Fe <sub>3</sub> O <sub>4</sub> @ 4% AC	10.40
MnO <sub>2</sub> / Fe <sub>3</sub> O <sub>4</sub> @ 8% AC	7.65
MnO <sub>2</sub> / Fe <sub>3</sub> O <sub>4</sub> @ 12% AC	13.10