

### Solvothermal Synthesis of $Mn_3O_4$ and $MnCO_3$

LAWAGON CHOSEL, Grace Nisola, \*

Department of Energy and Biotechnology (DEB), Energy and Environment Fusion Technology Center (E2FTC),

(wjc0828@gmail.com\*)

Solvothermal synthesis of manganese (II,III) oxide ( $Mn_3O_4$ ) and manganese (II) carbonate ( $MnCO_3$ ) nanocrystals were achieved by using potassium permanganate ( $KMnO_4$ ) as precursor in N,N-dimethylformamide (DMF) solvent. DMF acted as a weak slow reducing agent in the formation of  $Mn_3O_4$  and  $MnCO_3$  crystals. The products were characterized by X-ray powder diffraction (XRD), transmission electron microscopy (TEM) and C elemental analysis. The effects of pre-autoclave mixing, aging time (autoclave) and temperature as well as moisture were all investigated for the controlled synthesis of  $Mn_3O_4$  and  $MnCO_3$ . Higher process temperature and longer reaction time formed highly crystalline products. This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Ministry of Science, ICT & Future Planning (No. 2012R1A2A1A01009683) and the Ministry of Education (No. 2009-0093816).