

APPENDICES

APPENDIX A

Thermogravimetric analysis

The calculation of aluminium hydroxide hydrate amount that used in this experiment

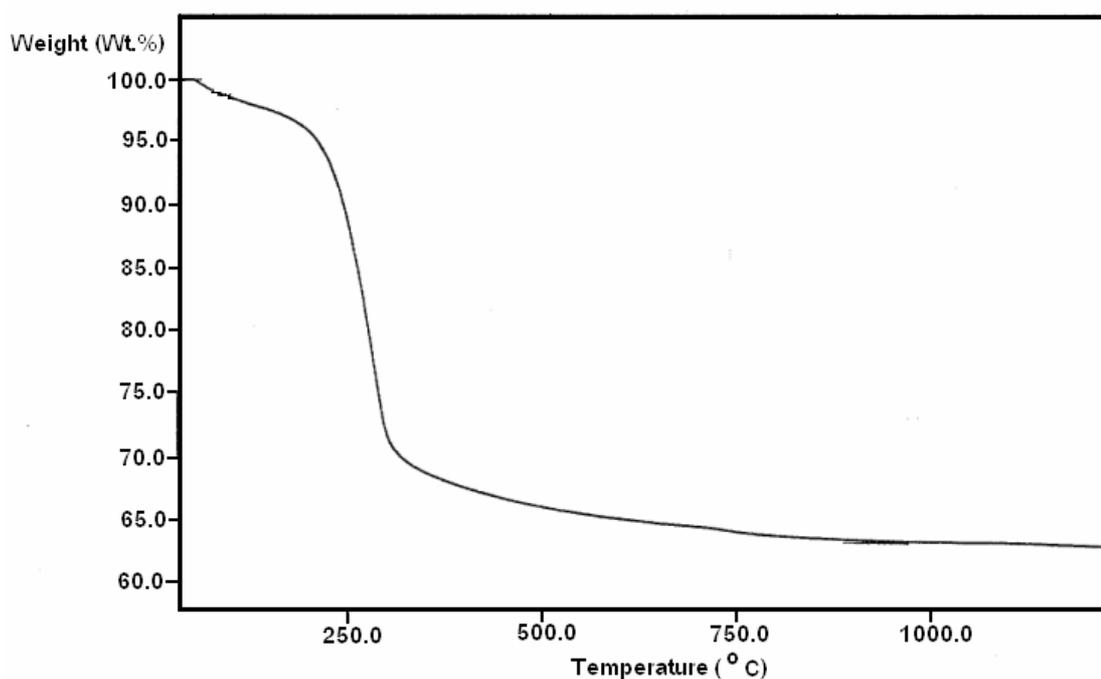


Figure A1 Thermogram of aluminium hydroxide hydrate

According to the thermogram in Figure A1, the ceramic yield of aluminium hydroxide hydrate is 63.20%(w/w) and the amount of aluminium hydroxide hydrate that used in this experiment can be calculated in the following;

If Al_2O_3 63.20 g the amount of $\text{Al}(\text{OH})_3 \cdot x\text{H}_2\text{O}$ that used is 100.00 g

$$\text{If } \text{Al}_2\text{O}_3 \text{ 10.20 g (100 mmol) the amount of } \text{Al}(\text{OH})_3 \cdot x\text{H}_2\text{O} \text{ that used is } \frac{10.20 \times 100.00}{63.20}$$

$$= 16.10 \text{ g}$$

So the amount of aluminium hydroxide hydrate that used in this experiment is 16.10 g

The calculation of nickel(II) hydroxide amount that used in this experiment

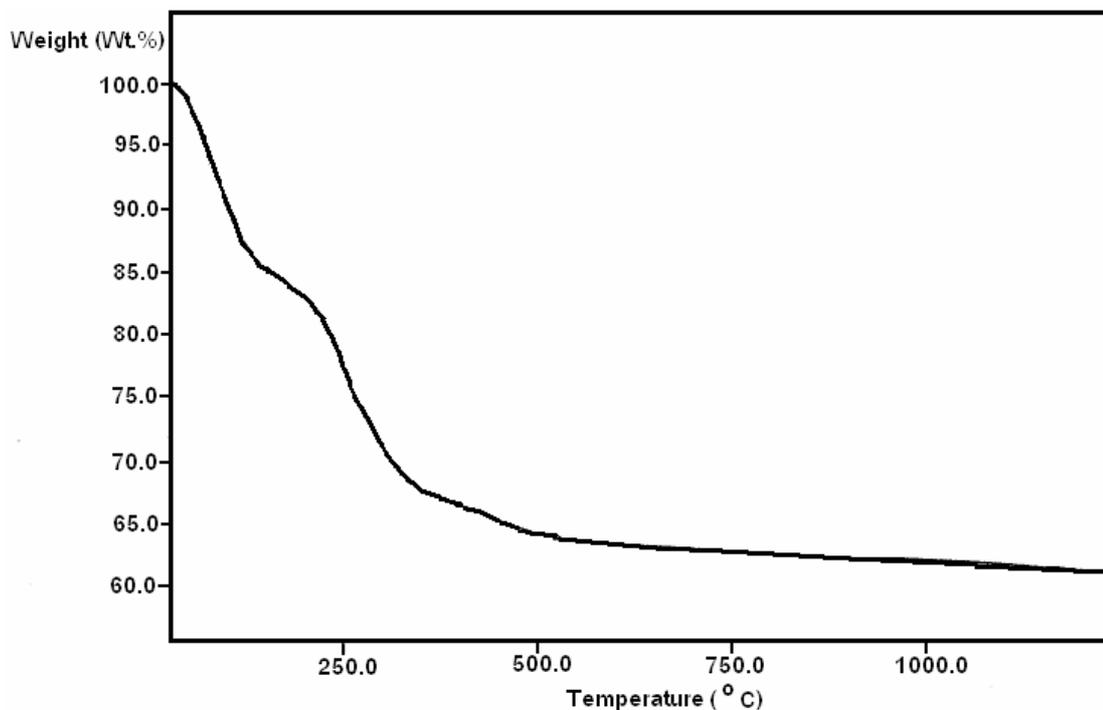


Figure A2 Thermogram of nickel(II) hydroxide

According to the thermogram in Figure A2, the ceramic yield of nickel(II) hydroxide is 66.40%(w/w) and the amount of nickel(II) hydroxide that used in this experiment can be calculated in the following;

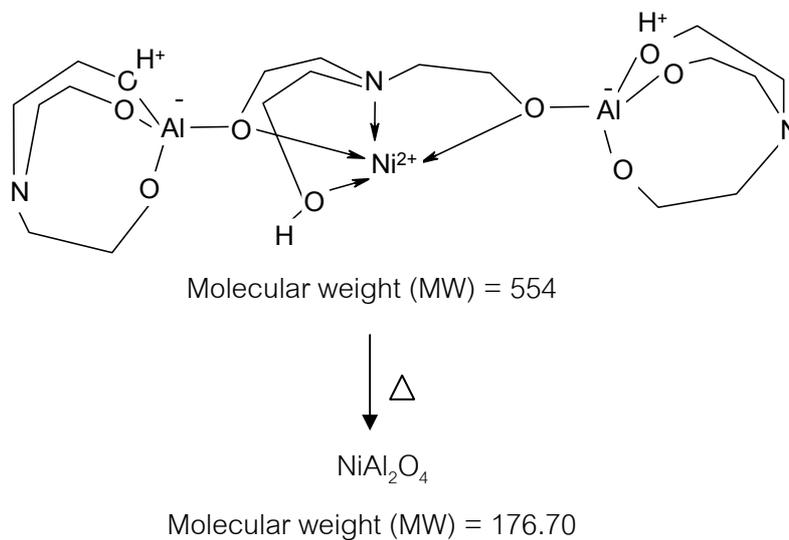
If NiO 66.40 g the amount of Ni(OH)₂ that used is 100.00 g

$$\text{If NiO } 7.47 \text{ g (100 mmol) the amount of Ni(OH)}_2 \text{ that used is } \frac{7.47 \times 100.00}{66.40} = 11.20 \text{ g}$$

So the amount of nickel(II) hydroxide that used in this experiment is 11.20 g

The calculation of theoretical and experimental ceramic yields and weight loss

From the following equation



The theoretical ceramic yield can be calculated in the following;

The nickel aluminate precursor 554 g can be decomposed to NiAl_2O_4 176.70 g

$$\begin{aligned} \text{The nickel aluminate precursor 100 g can be decomposed to } \text{NiAl}_2\text{O}_4 & \frac{100 \times 176.70}{554} \\ & = 31.90 \text{ g} \end{aligned}$$

So the theoretical ceramic yields is 31.90 % (w/w)

The theoretical weight loss value = $100 - 31.90 = 68.10$ % (w/w)

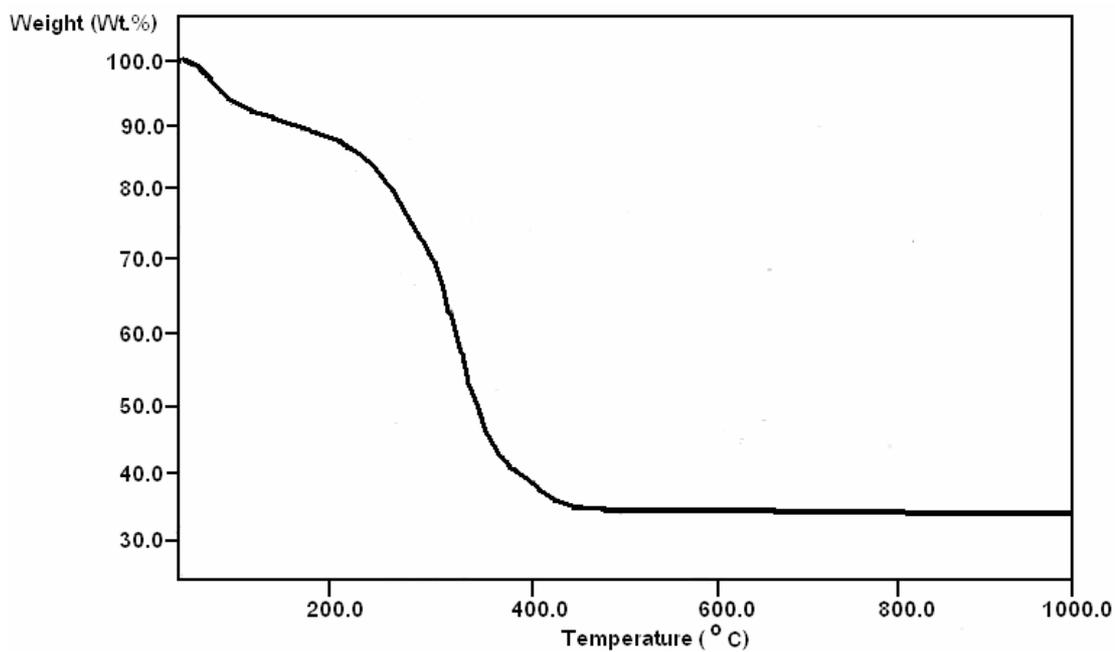


Figure A3 Thermogram of dried solid SPNO

According to the thermogram in Figure A3, the experimental weight loss and the ceramic yield of SPNO precipitate are 68.66 and 31.34 % (w/w).

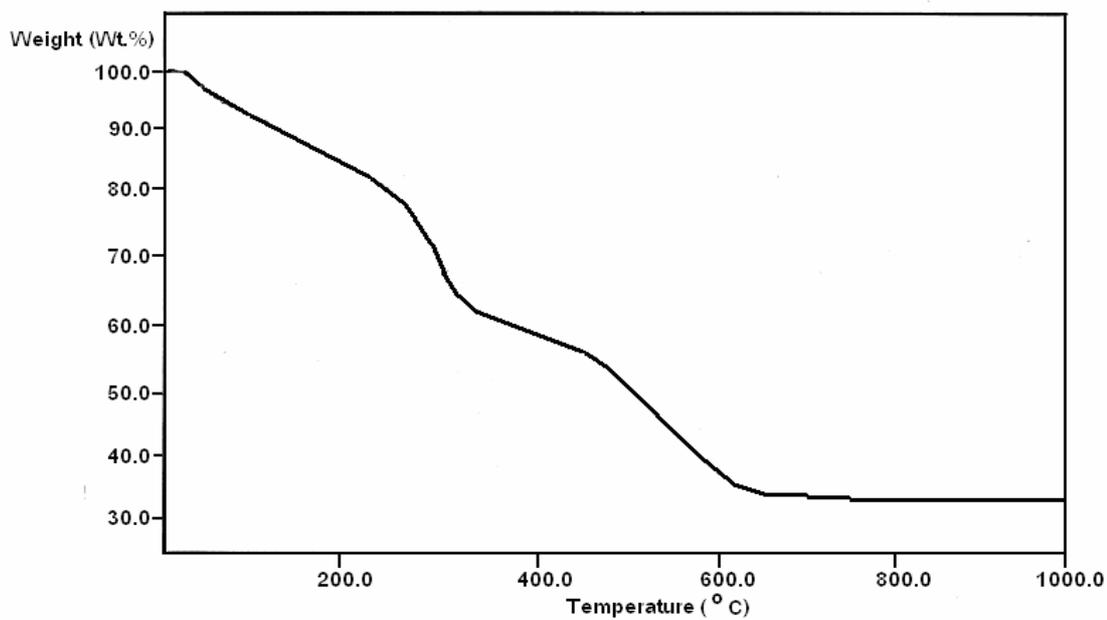


Figure A4 Thermogram of dried solid SPCI

According to the thermogram in Figure A4, the experimental weight loss and the ceramic yield of SPCI precipitate are 70.59 and 29.41 %(w/w).

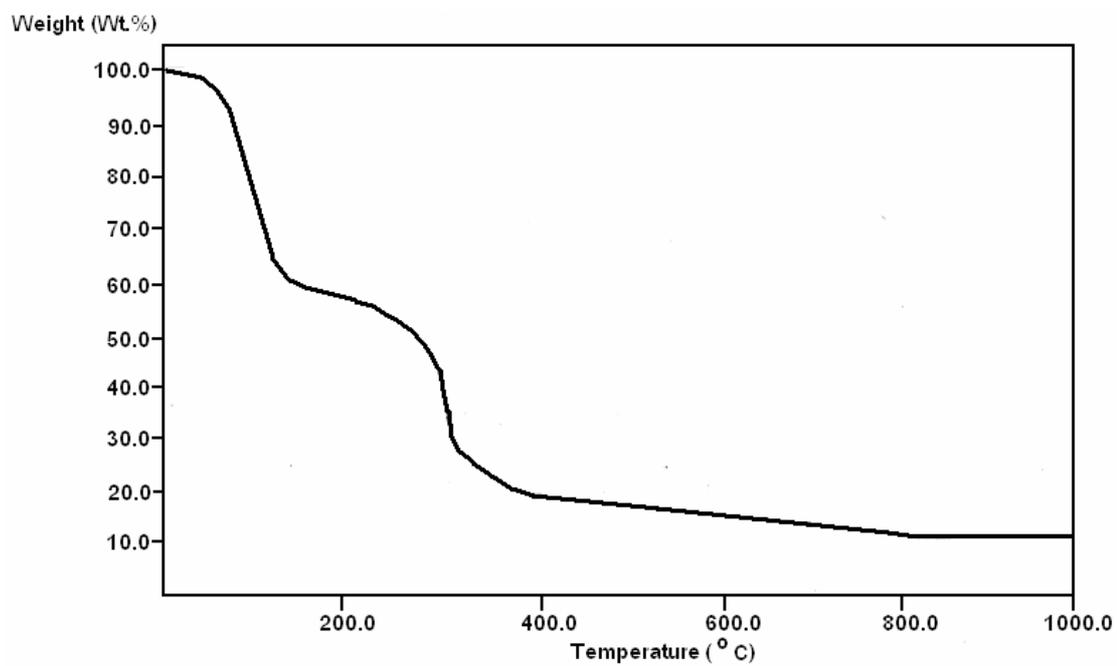


Figure A5 Thermogram of crude SPOH

According to the thermogram in Figure A5, the experimental weight loss and the ceramic yield of SPCI precipitate are 85.94 and 14.06 %(w/w).

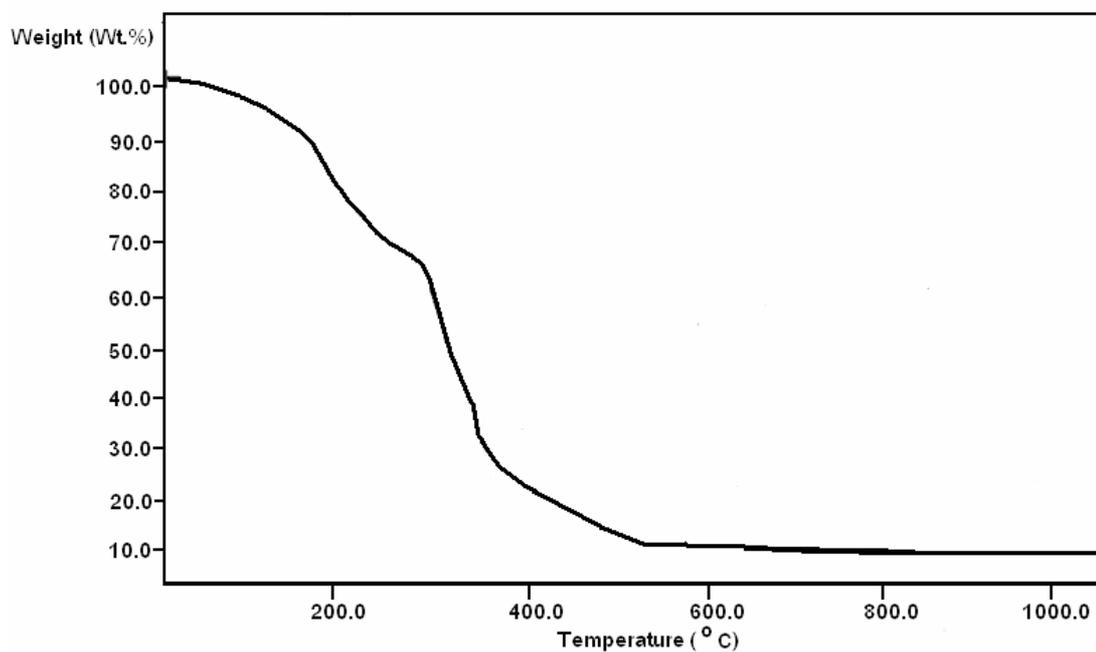


Figure A6 Thermogram of crude SPAC

According to the thermogram in Figure A6, the experimental weight loss and the ceramic yield of SPCl precipitate are 80.91 and 19.09 %(w/w).