

# Experiment 1

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## Synthesis

### Part 1 — Synthesis of $[\text{NiCl}_2(\text{PPh}_3)_2]$

$\text{NiCl}_2 \cdot 6 \text{H}_2\text{O}$  (0.66 g, 2.77 mmol) was dissolved in ethanol ( $12 \text{ cm}^3$ ) and warmed to *circa*  $40^\circ\text{C}$  to give a green solution. Triphenylphosphine (1.55 g, 5.9 mmol) was suspended in propan-2-ol ( $20 \text{ cm}^3$ ) and refluxed until fully dissolved. The warm nickel chloride solution was added down the condenser dropwise. The solution was refluxed for 20 minutes and then allowed to cool to room temperature. The product was isolated via vacuum filtration, washed with warm propan-2-ol ( $20 \text{ cm}^3$ ) and cold diethyl ether ( $10 \text{ cm}^3$ ). The product was allowed to dry giving a red powder. (1.24 g, 68 %)

### Part 2 — Synthesis of $[\text{Ni}(\text{NCS})_2(\text{PPh}_3)_2]$

$\text{Ni}(\text{NO}_3)_2 \cdot 6 \text{H}_2\text{O}$  (0.77 g, 2.64 mmol) was dissolved in ethanol ( $20 \text{ cm}^3$ ). Potassium thiocyanate (0.52 g, 5.36 mmol) was ground and added to the solution and then refluxed for 20 minutes. The solution was cooled on ice and then collected under gravity filtration. The solution was warmed to *circa*  $40^\circ\text{C}$ .

Triphenylphosphine (1.42 g, 5.42 mmol) was added to propan-2-ol ( $20 \text{ cm}^3$ ) and refluxed until the triphenylphosphine had dissolved. The nickel thiocyanate solution was added dropwise into the condenser and then refluxed for a further 15 minutes. The solution was cooled to room temperature and the product isolated via vacuum filtration. The product was washed with warm propan-2-ol ( $20 \text{ cm}^3$ ) and cold diethyl ether ( $10 \text{ cm}^3$ ). The product was dried on the filter giving a black powder. (0.41 g, 22 %)

## Analysis

Both products were analysed via a UV spectrum

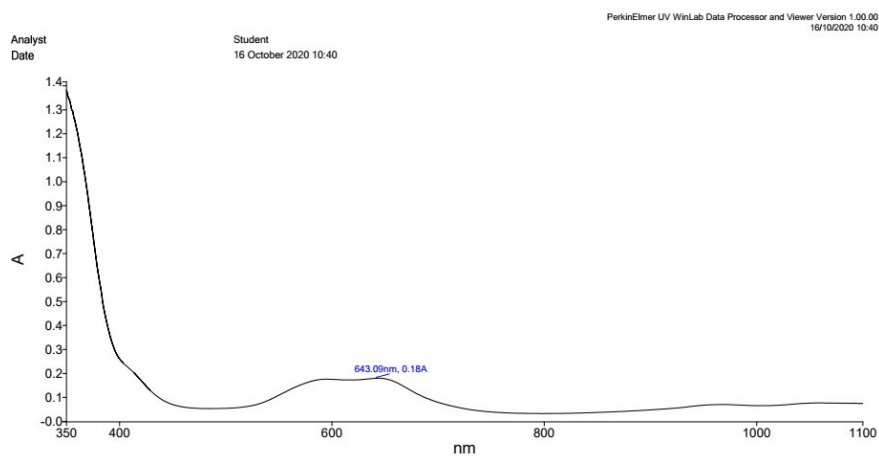


Figure 1: UV spectrum of  $[\text{NiCl}_2(\text{PPh}_3)_2]$  in a solution of dichloromethane

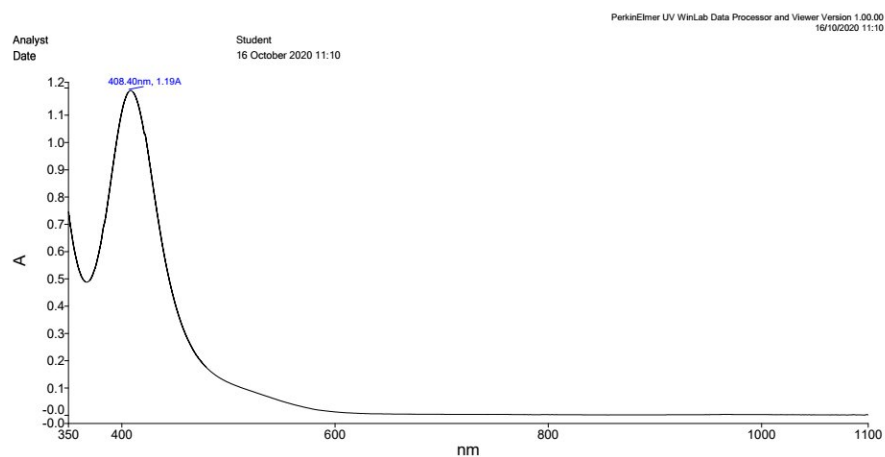


Figure 2: UV spectrum of  $[\text{Ni}(\text{NCS})_2(\text{PPh}_3)_2]$  in a solution of acetonitrile