

## Answer on Question#75716 – Chemistry – General chemistry

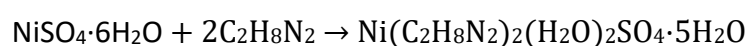
**Question:** Suppose you synthesized a Salt with formula  $\text{Ni(en)}_2(\text{H}_2\text{O})_2\text{SO}_4 \cdot 5\text{H}_2\text{O}$ . In your synthesis you used 0.037 mol of  $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$  and 0.007 mol of en. The actual yield (salt weighed out after synthesis) is 0.824 g. Calculate the percent yield. Report your answer in % but don't report the units (e.g. 58 for 58%)

**Solution:**

en is ligand with chemical formula  $\text{C}_2\text{H}_8\text{N}_2$ .



A reaction of synthesis the salt:



$$0.037 \text{ mol of } \text{NiSO}_4 \cdot 6\text{H}_2\text{O} > \frac{0.007 \text{ mol of en}}{2} = 0.0035 \text{ mol of en}$$

Therefore, **en** is limiting reagent.

$$\text{Theoretical yield of the salt in moles} = \frac{0.007 \text{ mol}}{2} = 0.0035 \text{ mol}$$

$$M(\text{C}_2\text{H}_8\text{N}_2) = 60.10 \text{ g/mol}$$

$$M(\text{Ni}(\text{C}_2\text{H}_8\text{N}_2)_2(\text{H}_2\text{O})_2\text{SO}_4 \cdot 5\text{H}_2\text{O}) = 401.06 \text{ g/mol}$$

$$n(\text{salt}) = \frac{m(\text{salt})}{M(\text{salt})} = \frac{0.824 \text{ g}}{401.06 \frac{\text{g}}{\text{mol}}} = 0.00205 \text{ mol} - \text{actual yield in moles}$$

$$\% \text{yield} = \frac{0.00205 \text{ mol}}{0.0035 \text{ mol}} \times 100\% = 59\%$$

**Answer:** 59.