

Calculation

Molecular mass of $\text{KMnO}_4 = 158 \text{ g / mol}$

Mass of KMnO_4 taken = 500mg

Moles of $\text{KMnO}_4 = 3.16 \text{ mmol}$

Mass of $\text{Mn}(\text{acac})_3$ obtained = 0.98g

Molecular Mass of $\text{Mn}(\text{acac})_3 = 355 \text{ g / mol}$

Moles of $\text{Mn}(\text{acac})_3$ obtained = 2.76 milimoles

1 mole of KMnO_4 gives 1 Mole of $\text{Mn}(\text{acac})_3$

Therefore, Theoretical Yield = 1121.8 mg

Percentage Yield = $\text{Experimental Yield} \times 100 / \text{Theoretical Yield}$

$$= 2.76 \times 100 / 3.16 = 87\%$$

Result

Mass of $\text{Mn}(\text{acac})_3$ obtained = 0.98g

Percentage Yield of $\text{Mn}(\text{acac})_3 = 87\%$

Melting Point of $\text{Mn}(\text{acac})_3 = 159^\circ\text{C}$

Precautions

1. The compound should be dried properly.
2. No residue of compound is to be left in the beaker, spatula etc.
3. Acetylacetone should be added drop-wise to avoid splashing.
4. $\text{Mn}(\text{acac})_3$ is toxic in nature. So, proper care must be taken.

Applications

1. Being a single electron oxidant, $\text{Mn}(\text{acac})_3$ is used in coupling of phenols.
2. It is used as a catalyst and co-catalyst in chemical reactions.
3. $\text{Mn}(\text{acac})_3$ is used as a catalyst in ring opening polymerization of benzene.
4. It is used in manufacture of dyes and biomolecules.