

- a) Methanoic acid
- b) Pentan-1, 4, dioic acid
- c) Butanedioic acid
- d) Ethanedioic acid
- e) Pentanedioic acid

2a) Physical appearance.

- Carboxylic acids up to C₁₀ are liquids at room temperature. The ones with higher molecular mass are solids at room temperature except glacial ethanoic acid which freezes below room temperature.

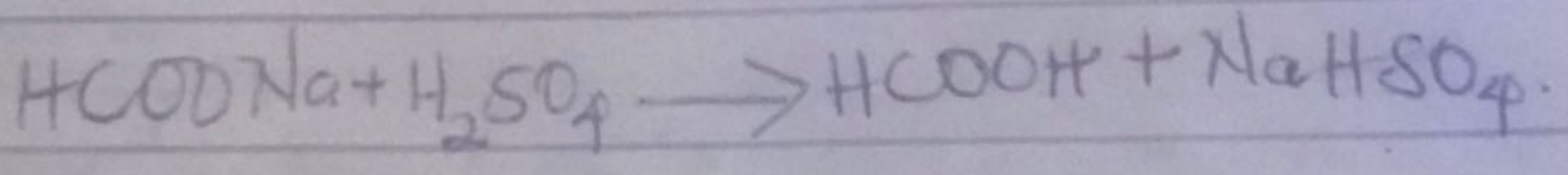
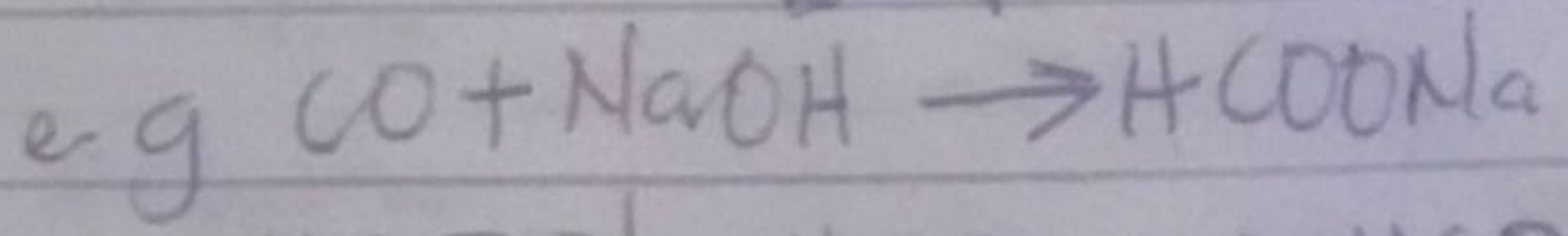
b) Boiling point - With increasing molecular mass, their boiling point increases.

c) Solubility - The solubility decreases with increasing molecular mass because their hydrocarbon increases, thus making them more hydrophobic. All carboxylic acids are soluble in organic solvents.

3) Two industrial preparations of carboxylic acids are:

1) From carbon (II) oxide - Carbon(II) oxide reacts with a hot aqueous solution of sodium hydroxide.

Addition of H₂SO₄ releases the free forming carboxylic acids.



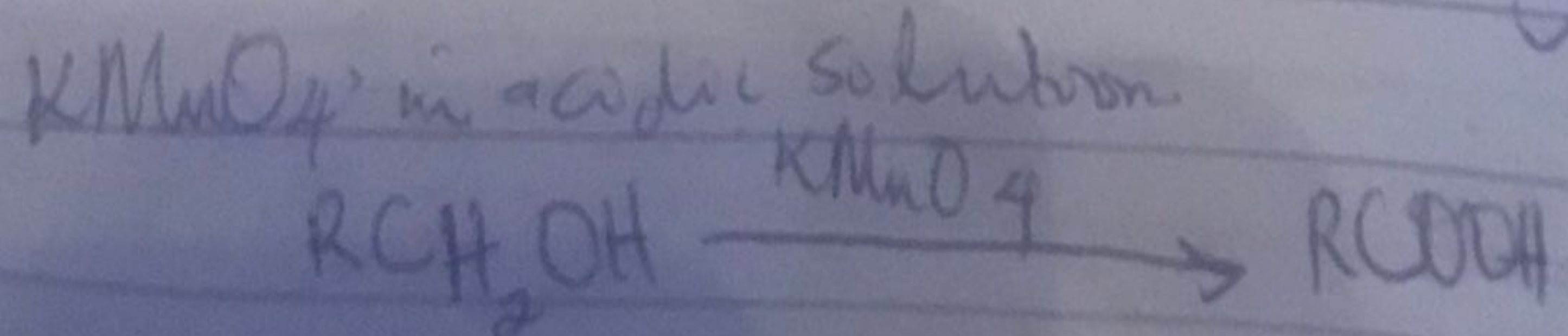
2) From petroleum

- Liquid phase air oxidation of C₅-C₇ alkenes with high temperature and pressure produces C₅-C₇ carboxylic acids.

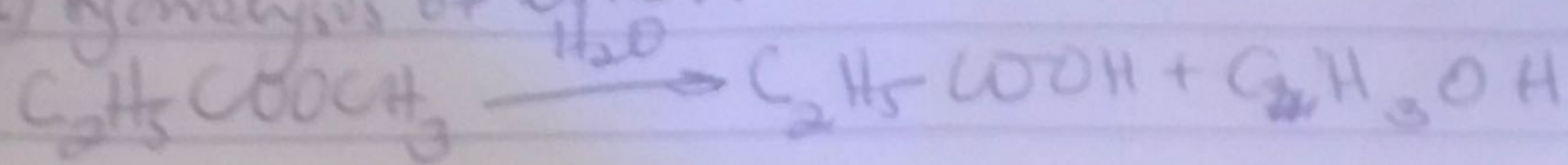
4) The synthetic preparation of carboxylic acid.

- Oxidation of primary alcohols and aldehydes.

→ This can be used to prepare carboxylic acids using K₂Cr₂O₇ or KMnO₄ in acidic solution.



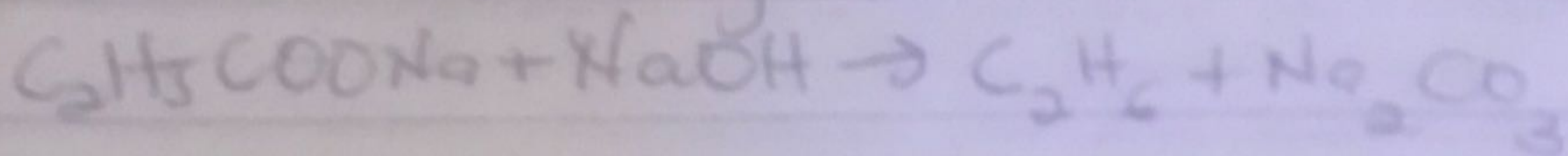
2) Hydrolysis of esters



3) The chemical reactions

1) Decarboxylation - This involves removal of the carboxyl group from the acid to give a hydrocarbon or its derivative.

Thermal decarboxylation



Esterification - In the presence of strong acid catalyst, carboxylic acids react with alcohols to form esters.

