Chikwuemerie Excellence
Chemical Engineering
19/ENG01/005

1. HCOOH - ~~hydroxycarboxylic~~ acid. methanoic acid.
2. $HOOCCH_2CH_2CH_2COOH$ - pentan-1,5-dioic acid.
3. $CH_3CH_2CH_2COOH$ - butanoic acid.
4. HO_2C-CO_2H - ethanedioic acid.
5. $CH_3(CH_2)_4COOH$ - hexanoic acid.
6. $CH_3CH=CHCH_2CH_2COOH$ - hex-4-enedioic acid

7. Physical properties
Simple carboxylic acids with less than or 10 carbon atoms are liquid. The rest of the majority are solid.

Boiling points
the ~~car~~ boiling points of the acids increases with increase in the number of carbon atoms

Solubility:
acids with 4 carbon atoms (or less) are soluble in water as a result of (-H). These acids are soluble in organic solvents.

8. Industrial Preparation
i) Adding carbon(II) oxide to NaOH with H_2SO_4 in a reversible reaction
ii) Oxidation of C_5-C_7 alkanes at high temperature and pressure

9. Synthetic preparation
+ Oixidation of primary alcohols using $KMnO_4$ in excess

$$C_2H_5OH \xrightarrow{[O]} CH_3CHO \xrightarrow{[O]} CH_3COOH$$

+ Hydrolysis of esters.

$$C_2H_3COOCH_3 \xrightarrow[\text{reflux}]{H^+} C_2H_5COOH + CH_3OH$$

Reduction

$$CH_3COOH \xrightarrow{LiAlH_4} CH_3CH_2OH + H_2O$$

Decarboxylation

$$CH_3COONa \xrightarrow{\Delta} CH_4 + CO_2$$

Esterification.

$$CH_3COOH + C_2H_5OH \overset{H^+}{\rightleftharpoons} CH_3COOC_2H_5 + H_2O$$