The Oxidation of phenylmethanol to benzoic acid

Alcohols oxidise to the corresponding aldehyde and then further oxidise to the corresponding carboxylic acid.

The phenylmethanol is placed in the conical flask with
- anhydrous sodium carbonate (to maintain alkaline conditions)
- potassium manganate (oxidising agent which is in excess to ensure complete oxidation).

On heating for 20 mins at 60°C the purple $\text{MnO}_4^-$ is reduced to Brown $\text{MnO}_2$.

The phenylmethanol is oxidised to Sodium benzoate

The flask is transferred to a fume cupboard and drops of concentrated HCl are added until fizzing subsides.

HCl does several things
- It is neutralising the Na$_2$CO$_3$ to H$_2$O and CO$_2$, the fizz, and a brown precipitate of MnO$_2$ (insoluble in water) is observed.
- It is neutralising the KOH produced
- The fizzing stops as all the carbonate is removed (i.e. no more alkaline conditions)
- It converts the solution to acidic conditions so that H$^+$ions are available for the further oxidation of the sodium benzoate and the reduction of the MnO$_2$ to Mn$^{2+}$. The solution is tested for acidity by dipping a glass rod and touching it off blue litmus paper which turns red.

Saturated sodium sulphite solution (reducing agent) is added to reduce the Brown MnO$_2$ to colourless Mn$^{2+}$ is added dropwise until the solution becomes clear.

The benzoic acid precipitates as the solution cools (because it is not very soluble in cold water). It is filtered off and allowed to air dry.

Benzoic acid crystals may be tested by melting point determination of the dried sample. Mp = 122°C.
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