SYNTHESIS OF ASPIRIN

Aspirin is acetylsalicylic acid, and is easily prepared from salicylic acid and acetic anhydride.

Acetylsalicylic acid decomposes when heated and therefore does not possess a well-defined melting point.

Procedure:

1. Place 2.0 g salicylic acid and 3 mL (3.2 g) acetic anhydride in a small dry 50 conical flask, and add 4 drops concentrated sulphuric acid. Swirl the flask gently to mix thoroughly. Warm on a water bath at 50°C for about 15 minutes.

2. Cool in an ice bath and add 20mL distilled water while stirring. Filter with suction, using a Buchner funnel.

3. Leave suction on until product appears dry.

4. Weigh crude product.

5. The product may be recrystallised as follows:
   Dissolve the material in about 6 mL hot ethanol 50 - 60°C. Add warm water (about 14 mL) until cloudiness appears. If a precipitate forms, warm the mixture until clear, then allow to cool slowly. Use an ice bath at the end. Suction filter, dry and weigh.

Exercises

1. Determine which reagent is present in excess on a molar basis.

2. Calculate the theoretical yield of product based on the limiting reagent used.

3. Calculate % yield based on mass of crude product.

4. Give the IUPAC name for salicylic acid?

5. Some decomposition of the aspirin may occur on boiling in water solution. What are the decomposition products?