

- 1) Separate the 50:50 solution of toluene and distilled water using a separation funnel. *Because the Sodium Benzoate is already dissolved in the water, we do not need the toluene in synthesising the Benzoic acid, so we can remove it from the rest of the procedure. If we leave the toluene in, it will get in the way of the recrystallization and purification.*
- 2) Add 13.8mL of HCl to the water. The HCl will react with the Sodium Benzoate in the water, producing NaCl and Benzoic acid as the products. *In order to maximize the yield of Benzoic acid, the 2g (0.0139mol) of Sodium Benzoate is used as the limiting reagent. 4.6mL of a 3M solution of HCl contains 0.0139mol of HCl, and because the reaction of HCl and Sodium Benzoate is 1:1, HCl is added in excess by a factor of 3, so we add 13.8mL of 3M HCl (0.0416mol) to the solution.*
- 3) Chill the reaction mixture in an ice bath for 10 minutes. This should allow the Benzoic acid to precipitate as it is insoluble in cold water. *Benzoic acid is insoluble in cold water, so by chilling it, the Benzoic acid will precipitate out from the rest of the solution, which allows us to filter it.*
- 4) Filter the Benzoic acid from the rest of the solution using a filtration apparatus. *By filtering the Benzoic acid, we can then redissolve it in order to purify it.*
- 5) Heat 50mL of distilled water on a hot plate at 95°C for 10 minutes, and add the Benzoic acid to the solution. *Benzoic acid is soluble in hot water, so it will dissolve in the heated water.*
- 6) After all of the Benzoic acid is dissolved in water, take it off of the hot plate and let it cool for on the table. After the solution has cooled down, chill in an ice bath for 10-15 minutes. *Benzoic acid is not soluble in cold water, so this will recrystallize the Benzoic acid and separating it from any contaminants that are soluble in water.*
- 7) Filter out the Benzoic acid from the rest of the solution using a filtration apparatus. *We need to isolate the Benzoic acid to find the purified yield.*
- 8) Let the Benzoic acid dry out and weigh it.
- 9) Test the purity of the Benzoic acid by testing its melting point.