

AP[®] Chemistry Review Questions

Integrating Content, Inquiry and Reasoning

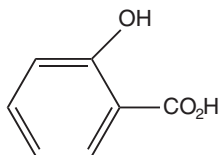


Figure 3. Salicylic Acid

Acetylsalicylic acid (aspirin) is prepared commercially from its parent acid, salicylic acid (structure shown in Figure 3 above). A solid mixture of charcoal and salicylic acid was separated by dissolving the solid in aqueous sodium hydroxide solution, filtering the mixture, and acidifying the solution to recover the salicylic acid. The following results were obtained:

Charcoal–Salicylic Acid Mixture (Observations)	Gray powder. Some larger “chunks” or pieces of dark solid and a few white crystals are visible with a magnifying glass.
Mass of Erlenmeyer flask	40.25 g
Mass of Erlenmeyer flask and charcoal–salicylic acid mixture	40.77 g
Mass of filter paper (1)	1.26 g
Mass of filter paper (1) and charcoal	1.50 g
Mass of filter paper (2)	1.25 g
Mass of filter paper (2) and salicylic acid	1.52 g

- Write a balanced chemical equation for the neutralization reaction of salicylic acid with sodium hydroxide.
- Calculate the *percent recovery* of the charcoal–salicylic acid mixture.
- Determine the *mass percent* of (a) charcoal and (b) salicylic acid in the mixture.
- Label each of the following as a *physical* or *chemical change*.
 - Salicylic acid dissolves in the sodium hydroxide solution.
 - The mixture is filtered to separate the charcoal.
 - The filtrate is acidified to precipitate the salicylic acid.
- Salicylic acid may be crystallized from hot water by dissolving the solid in a minimum amount of boiling water and then cooling the mixture to room temperature. Is this a physical or a chemical change?