

Synthesis of Aspirin

Data Table

Mass of salicylic acid used	
Mass of watch glass	
Mass of watch glass and acetylsalicylic acid	
Melting point of acetylsalicylic acid	

Results of Fe³⁺ Tests — Observations

Salicylic acid	
Reaction product	
Crushed aspirin	

Post-Lab Questions *(Answer the following questions on a separate sheet of paper.)*

- Calculate the number of moles of salicylic acid used in this experiment.
- Calculate the maximum amount of acetylsalicylic acid in grams that may be obtained from this amount of salicylic acid. This is the theoretical yield. *Hint: See Pre-Lab Questions #4 and 5.*
- Determine the mass of aspirin obtained in this experiment and calculate the *percent yield*.

$$\text{Percent yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100\%$$

- Iron(III) ions are used as a qualitative test for *phenols* (aromatic compounds containing an –OH functional group).
 (a) What compound was used as a *positive control* for the Fe³⁺ test in this experiment? (b) Did the reaction product give a positive or negative test with Fe³⁺ ions? Explain.
- Old aspirin tablets often have a faint vinegar (acetic acid) smell and give a positive test with iron(III) ions. Write a balanced chemical equation for the *hydrolysis* of aspirin (reaction of aspirin with water) to explain these observations.
- Acetic anhydride was used in excess in this experiment. What does this mean, and how was the excess acetic anhydride decomposed at the end of the reaction?
- Look up the melting points of salicylic acid and aspirin (acetylsalicylic acid) in a reference book or online and compare with the melting point of the reaction product.