

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.)

- 1. Calculate the number of moles of salicylic acid used in this experiment.
- 2. 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.
- 3. Determine the mass of aspirin obtained in this experiment and calculate the *percent yield*.

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

- 4. 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.
- 5. 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 *bydrolysis* of aspirin (reaction of aspirin with water) to explain these observations.
- 6. 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?
- 7. 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.

© 2019, Flinn Scientific, Inc. All Rights Reserved. Reproduction permission is granted from Flinn Scientific, Inc. Batavia, Illinois, U.S.A. No part of this material may be reproduced or transmitted in any form or by any means, electronic or mechanical, including, but not limited to photocopy, recording, or any information storage and retrieval system, without permission in writing from Flinn Scientific, Inc.