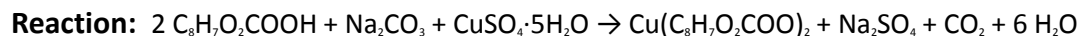
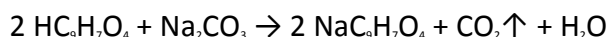


## Preparation of Copper (II) Acetylsalicylate Pigment



**Introduction:** The compound Copper (II) Acetylsalicylate,  $\text{Cu}(\text{C}_8\text{H}_7\text{O}_2\text{COO})_2$ , is being tested as a new blue pigment for Senior Paint Day. A synthesis procedure was developed by the Gold Tigers of Honors Chemistry II, and I would like my Honors Juniors to reproduce it.

The ingredients are common and familiar. Aspirin tablets from Dollar Tree were purified by crystallization in previous years to obtain pure “aspirin”, acetylsalicylic acid ( $\text{C}_8\text{H}_7\text{O}_2\text{COOH}$ ). Sodium carbonate ( $\text{Na}_2\text{CO}_3$ ) aka ‘soda ash’ is a common base, available as a household chemical. They can be reacted to provide a solution of sodium acetylsalicylate:



It is important to use an excess amount of acetylsalicylic acid here (more than a 2:1 ratio of moles of each) so that all the  $\text{Na}_2\text{CO}_3$  will be reacted. Leftover  $\text{Na}_2\text{CO}_3$  will interfere with the next step of the reaction! Undissolved acetylsalicylic acid can be removed by filtration.

Once the solution of sodium acetylsalicylate ( $\text{NaC}_9\text{H}_7\text{O}_4$ ) is prepared, it can be reacted with copper (II) sulfate ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ) to form the product  $\text{Cu}(\text{C}_8\text{H}_7\text{O}_2\text{COO})_2$  as a precipitate. This can be collected by filtration and allowed to dry.

### Procedure:

- 1)** Weigh out 3 grams of purified aspirin (acetylsalicylic acid) and 0.75 gram of sodium carbonate ( $\text{Na}_2\text{CO}_3$ ). Use weighing boats or cups for this: be sure to tare the empty cup by balancing on a triple-beam scale, before advancing the grams slider by the amount desired, and then weighing until the cup balances again.
- 2)** Dissolve the sodium carbonate in a small amount of water – 50 mL should be sufficient – with stirring. Add the purified aspirin and stir in until as much as possible dissolves. Some bubbles of carbon dioxide gas ( $\text{CO}_2$ ) should be visible – add the aspirin slowly if necessary, to prevent the mixture from foaming over the benchtop. Filter the solution to obtain a solution of sodium acetylsalicylate ( $\text{NaC}_9\text{H}_7\text{O}_4$ ).
- 3)** Weigh out 1.1 grams of copper (II) sulfate. Dissolve in a small amount of water – 50 mL should be enough – with stirring. If some copper (II) sulfate remains undissolved, filter this solution to remove it. Add this solution to your solution of sodium acetylsalicylate.
- 4)** Stir your reaction until it is no longer a ‘gel’ but has a clear solid precipitate. Collect the precipitate on filter paper and leave aside to dry.