Synthesis of aspirin

Science, Chemistry

Your Module Synthesis of Aspirin The purpose of the experiment is to synthesize aspirin form salicylic acid and acetic anhydride according to the following reaction:

Figure 1: Synthesis of aspirin (Clayden, et al., 558).

A round bottom flask was charged with 1 g (0. 0072 mol) of salicylic acid, 3 ml (0. 03 mol) of acetic anhydride and 4 drops of 85% phosphoric acid as catalyst. It was equipped with a reflux condenser, heated to 100 F and stirred vigorously. After 15 minutes of boiling 1 ml of water was added to convert all unreacted acetic anhydride to acetic acid. The reflux condenser was removed after 3 minutes to allow all the produced acetic acid to evaporate. The reaction mixture was cooled in an ice bath, and water was adder to assist crystal formation. The obtained aspirin crystals were collected, washed from the remaining reagents and partially dried in a Buchner funnel. Performing all the described above operations afforded 0. 55 g (42. 6%) of the product.

The obtained product was tested for unreacted salicylic acid. Aspirin product was added to the first test tube and salicylic acid was added in the second test tube. Iron (III) chloride was added in both test tubes. Salicylic acid has the ability to form purple complexes with iron (III) ion (Figure 2). This color was not observed in case of synthesized aspirin what points out to the fact that all salicylic acid was removed.

As it was established, the melting range of the product was 129-1310C. Comparing this result with literature data (134-1360C) it can be concluded that extra drying is required (Clayden, et al., 558) .

Figure 1: Salicylic acid complex with iron (III) (Clayden, et al., 558).

Works cited

Clayden, Jonathan, Greeves, Nick, Warren, Stuard, and Peter Wothers, Organic chemistry. Shanghai: C&C Offset Printing Co., Ltd., 2001. Print.