Synthesis and Decomposition of Aspirin

Abstract

The Objective : The objective of my project was to formulate and use an assay that would help me test the purity of aspirin, and then help me determine the aspirin's decomposition over time.

Methods/Materials

A spectrometer (Spectronic 20), salicylic acid, iron (III) nitrate, iron (III) chloride, phosphoric acid, sulfuric acid, acetic anhydride, anhydrous sodium acetate, methylene chloride, hydrochloric acid, and samples of old, expired aspirin in order to synthesize aspirin in four different ways with different acids and bases, and test its purity.

It was tested the aspirins purity by combining a sample of the aspirin with my assay (either iron (III) chloride or iron (III) nitrate; both worked exactly the same way).

It was tested the purity and decomposition of expired aspirin the same way: I combined the aspirin with my assay and measured the absorbance of light through the resulting mixture in a spectrometer.

Results

Despite difficulties, it was developed an iron (III)-based assay for salicylic acid that was sensitive and reliable of 0.01 molarity.

It was was able to use my assay to test the samples of aspirin that had synthesized, and test samples of expired aspirin taken from my neighbors.

The tests of the synthesized aspirin were very successful in determining which catalyst (phosphoric acid) generated the highest yield of aspirin.

Also, the tests of the expired aspirin showed something interesting, and logical: the enteric coating around aspirin turns out to preserve aspirin very well by protecting the actual aspirin from moisture and light, while contrastingly, aspirin with little or no coating decomposes much more rapidly.

Conclusions/Discussion

It succeeded in determining the ideal concentration of an assay, iron (III) for testing my aspirin. The Aspirin was manufactured using both acids and bases, and then could test both the purity of this aspirin and of decomposing aspirin, using my assay.

Though the assay worked well enough for my experiment, the exact equilibrium between iron (III) and salicylic acid remains a curiosity; It would like to look further to determine exactly why the iron of my assay

appears to disobey Le Chatliers Principle by becoming less reactive at higher concentrations.

By working on this project, It was successfully accomplished my objective by developing an iron (III)-based assay of 0.01 molarity that could be used to accurately test aspirin that I had synthesized, and to test expired, decomposing aspirin.

Bibliography

www.thechemistryguru.com