

20.4: Reactions of Amides

This page describes the hydrolysis of amides under both acidic and alkaline conditions. It also describes the use of alkaline hydrolysis in testing for amides.

What is hydrolysis?

Technically, hydrolysis is a reaction with water. That is exactly what happens when amides are hydrolyzed in the presence of dilute acids such as dilute hydrochloric acid. The acid acts as a catalyst for the reaction between the amide and water. The alkaline hydrolysis of amides actually involves reaction with hydroxide ions, but the result is similar enough that it is still classed as hydrolysis.

Hydrolysis under acidic conditions

Taking ethanamide as a typical amide. If ethanamide is heated with a dilute acid (such as dilute hydrochloric acid), ethanoic acid is formed together with ammonium ions. So, if you were using hydrochloric acid, the final solution would contain ammonium chloride and ethanoic acid.



Hydrolysis under alkaline conditions

Also, if ethanamide is heated with sodium hydroxide solution, ammonia gas is given off and you are left with a solution containing sodium ethanoate.



Using alkaline hydrolysis to test for an amide

If you add sodium hydroxide solution to an unknown organic compound, and it gives off ammonia on heating (but not immediately in the cold), then it is an amide. You can recognize the ammonia by smell and because it turns red litmus paper blue.

The possible confusion using this test is with ammonium salts. Ammonium salts also produce ammonia with sodium hydroxide solution, but in this case there is always enough ammonia produced in the cold for the smell to be immediately obvious.

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