Azo, Diazo, Azine, and Azide Groups Encyclopedia Article

Azo, Diazo, Azine, and Azide Groups

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Each of these groups is characterized by the presence of nitrogen-nitrogen bonds. The azo group contains two **nitrogen** atoms joined by a triple bond (R--N N--R); the diazo group has two nitrogens with a double bond (R=N=N); the azine group has a **carbon** double bonded to a nitrogen which is single bonded to another nitrogen and this is double bonded to another carbon ($(R_2C=N--N=CR_2)$; and the azide group has three nitrogens and two double bonds (R--N=N=N). The names of these groups are derived from the Greek word *azote* meaning "without life," the name for nitrogen proposed by French chemist **Antoine-Laurent Lavoisier**. (Lavoisier proposed this name due to the inertness of elemental nitrogen in chemical reactions.)

Many of the compounds containing these groups are extremely good dyes. The are used to dye fabrics such as wool and cotton, and also as dyes in photographic processes. The alkali salts of these groups are generally stable, although there is a tendency for them to degrade on heating. Heavy metal salts of these compounds are generally very explosive and are used in the manufacture of such devices as percussion caps.

The **chemistry** of these groups is related to the multiple-bonded nitrogens. Splitting across this bond can occur to yield such products as amines. These compounds can be prepared from **reduction** of nitro compounds (azo), by the action of **nitric acid** on amines (diazo), from compounds containing the **carbonyl group** (azines), and from the salts of hydrazoic acid (azide).