Volatility Encyclopedia Article

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A volatile substance is one which evaporates readily. Well-known examples are **gasoline** and dry ice. Although a qualitative concept, it has found considerable application in the development of **chemistry** as a science.

In the early years of chemistry, as scientists sorted out basic concepts, the term volatile was applied to materials which would yield **gases** upon various chemical treatments. A common substance which was widely studied was *sal volatile*, also known as volatile alkali. This substance is known today as ammonium carbonate. Ammonium carbonate is a solid, but chemical treatment can result in its breakdown, releasing **ammonia** and **carbon** dioxide, both gases under normal conditions. Such a disappearance of a solid into the gas phase was an intriguing phenomenon. Two prominent early chemists, **Robert Boyle** and **Joseph Black** were among those who studied the reactions of volatile alkali. Boyle also wrote of volatile nitre (saltpeter) which is either **potassium** or **sodium** nitrate. Under certain treatments, saltpeter yields **nitrogen** gas. Antoine-Laurent Lavosier experimented with volatile sulphurous acid which readily yields the gas **sulfur** dioxide.

In present usage, the volatility of a substance refers to the relative ease with which it can be vaporized. Quantitative measures of volatility include **vapor pressure** and **boiling point**. Substances with high vapor pressures are highly volatile. Since the boiling point of a substance is the **temperature** at which its vapor pressure is equal to the atmospheric pressure, a substance whose boiling point is lower than another's is said to be more volatile. For instance, **bromine** and **mercury** both exist as **liquids** at room temperature, but bromine boils at 138°F (59°C) while mercury's boiling point is 693°F (367°C). Bromine is considerably more volatile than mercury. The boiling points of some common materials regarded as having high volatility are: chloroform, 142°F (61°C); **ether**, 95°F (35°C); and gasoline, 158-194°F (70-90°C).