

Cation Encyclopedia Article

Cation

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Cation

A cation is a positively charged **ion**. The name comes from a 19th century combination of cata (from the Greek for down, kata) and ion. During **electrolysis**, cations are reduced at the cathode.

Cations have all lost one or more electrons, giving them a net positive charge. Thus, cations have more protons than electrons. Monatomic (single atom) cations are typically either metallic elements or **hydrogen**. This is because these are the elements with a tendency to lose electrons in a reaction, making them positively charged. Cations can, however, also be positively charged groups of atoms (polyatomic cations) such as ammonium NH_4 . In nature, cations cannot exist by themselves. They are always in the presence of anions (negative ions). Cations and anions can only exist in ionic compounds, nearly all of which are **solids** at room **temperature**, or in **solution**. A cation will form an **ionic bond** with an **anion**. In an ionic compound, the sum of the positive charge(s) of the cation(s) and the negative charge(s) of the anion(s) must be zero. The actual formula of the ionic compound (and the number of cations and anions) will thus depend on the relative charges of the anion and cation. The charge on a cation is typically +1, +2, or +3. The majority of **metals** have a cation with a +2 charge, although some can exist in different forms. For example, **iron** exists as both a +2 and a +3 cation. The characteristics of the +2 and +3 form are slightly different. Iron nitrate can be found as iron (II) nitrate or iron (III) nitrate, the former being green in **color** while the latter is pale violet.