Metalloid Al and Ga clusters open our eyes to the complexity of chemical processes during formation and dissolution of metals

Abstract

Most elements of the periodic table are metals. Their chemistry, and especially their formation and dissolution, belong to the oldest chemical technology, which has played a central role in the evolution of mankind. In general, however, only the bulk metals themselves, on the one hand, and their stable compounds (e.g., salts, oxides, or sulfides in solution or in bulk), on the other hand, are well-known. Thus, it seems strange that intermediates in the formation and breaking of metal-metal bonds are mostly unknown, although, as mentioned above, this process has had a vital role in the evolution of the planet in general, and of human life in particular. These fundamental processes of formation as well as dissolution of metals and of identification of molecular intermediates exhibiting metal-metal bonding are central to this lecture. The interrelations of metalloid clusters and naked metal atom clusters to the large field of other types of clusters and to classical inorganic chemistry are visualized in the figure.