Inorganic Chemistry for Geochemistry and Environmental Sciences: Fundamentals and Applications
George W. Luther III

DESCRIPTION

Inorganic Chemistry for Geochemistry and Environmental Sciences: Fundamentals and Applications discusses the structure, bonding and reactivity of molecules and solids of environmental interest, bringing the reactivity of non-metals and metals to inorganic chemists, geochemists and environmental chemists from diverse fields. Understanding the principles of inorganic chemistry including chemical bonding, frontier molecular orbital theory, electron transfer processes, formation of (nano) particles, transition metal-ligand complexes, metal catalysis and more are essential to describe earth processes over time scales ranging from 1 nanosec to 1 Gigayr.

Throughout the book, fundamental chemical principles are illustrated with relevant examples from geochemistry, environmental and marine chemistry, allowing students to better understand environmental and geochemical processes at the molecular level.

Topics covered include:

• Thermodynamics and kinetics of redox reactions
• Atomic structure
• Symmetry
• Covalent bonding, and bonding in solids and nanoparticles
• Frontier Molecular Orbital Theory
• Acids and bases
• Basics of transition metal chemistry including
• Chemical reactivity of materials of geochemical and environmental interest

Supplementary material is provided online, including PowerPoint slides, problem sets and solutions.

Inorganic Chemistry for Geochemistry and Environmental Sciences is a rapid assimilation textbook for those studying and working in areas of geochemistry, inorganic chemistry and environmental chemistry, wishing to enhance their understanding of environmental processes from the molecular level to the global level.

About the Author

Professor George W. Luther, III, School of Marine Science & Policy, University of Delaware, USA

Professor Luther has joint appointments in the Department of Chemistry and Biochemistry, Department of Civil and Environmental Engineering and the Department of Plant and Soil Science.

Professor Luther taught an ACS accredited course on advanced inorganic chemistry from 1973-1986 to senior undergraduate students. As he moved into environmental and marine chemistry, he began using environmental examples in inorganic chemistry. In 1988, he started a similar course titled 'Marine Inorganic Chemistry' that has been taught biannually at the University of Delaware, attracting students in Chemical Oceanography, Chemistry and Biochemistry, Geology / Geochemistry, Civil and Environmental Engineering and Plant and Soil Science.

In 2013, Professor Luther was awarded the Geochemistry Division Medal by the American Chemical Society for his wide-ranging contributions to aqueous geochemistry. He is recognised for the application of physical inorganic chemistry to the transfer of electrons between chemical compounds in the environment, and also the development of chemical sensors for quantifying the presence of elements and compounds in natural waters.

Professor Luther was named a fellow of the American Association for the Advancement of Science in 2011 and the American Geophysical Union in 2012.