

School of Chemistry

Aims and Objectives: Session 2023-2024, Semester 1

Module CH2501: Inorganic Chemistry 2

Course Title: The Chemistry of the Atmosphere

Duration: 6 hours

Lecturer: Dr B. A. Chalmers

Aims: To explore the various roles and the composition of the layers of the atmosphere in protecting life from harmful radiation, the natural greenhouse effect and the cycling of nutrients. To look at the effects of man-made changes to the atmosphere, including ozone depletion, global warming and ocean acidification. To try to understand these processes in terms of a molecular level appreciation of the bonding and reactivity of the species involved.

Objectives: On successful completion of this part of the module the student will be able to:

1. Describe the composition of the Earth's atmosphere and to know which photochemical processes are involved in each layer, and to know which elements are most quickly recycled.
2. To be able to determine the pressure and concentration of gases at a given altitude and temperature and relate this to sea level.
3. To understand the electromagnetic spectrum and perform calculations based on this.
4. To be able to explain what the ozone layer is, how it is formed, why it is useful and rationalize its concentration around the atmosphere.
5. To be able to explain and understand the chemistry behind ozone depletion, to study trends in data, explain what a CFC is and their contribution to atmospheric chemistry.
6. To understand the concept of Global Warming through data trends, the chemistry involved and to understand the infrared spectroscopy of carbon dioxide and other atmospheric molecules, and the consequences for global warming.
7. To understand and appreciate the concept of ocean acidification and the chemistry behind this and to explain the effects this has on the ocean ecosystem.
8. To be able to explain the chemistry underpinning photochemical smog and pollution at ground level.