

School of Chemistry

Aims and Objectives: Session 2023-2024, Semester 1

Module CH2501: Inorganic Chemistry 2

Course Title: Chemistry in the Solid State

Duration: 6 hours

Lecturer: Dr Jan-Willem Bos

Aims: To extend the concepts of close-packing to describe the structures of crystalline inorganic compounds. To rationalise why compounds adopt one crystal structure rather than another. To be aware of the origin and nature of defects in inorganic solids.

Objectives:

1. To understand the two basic types of close-packing in solids, and the nature of tetrahedral/octahedral interstices.
2. To be able to describe the structures of simple close-packed inorganic compounds (eg. NaCl, NiAs, ZnS, CaF₂, SrTiO₃) in terms of filling of octahedral and tetrahedral sites.
3. To become familiar with the concepts of ionic size, radius ratios, oxidation state, cation coordination preferences, in the adoption of particular structure types by particular stoichiometries.
4. To understand the formation of simple defects (eg. Frenkel and Schottky) in ionic solids, and the manipulation of structure and composition of solids via solid-solution formation.
5. To understand the concept of bond-valence and its use in rationalising the structure of simple solids.