# CHAPTER OVERVIEW

## 6: Metals and Alloys- Structure, Bonding, Electronic and Magnetic Properties

**Learning Objectives**

- Identify and assign unit cells, coordination numbers, asymmetric units, numbers of atoms contained within a unit cell, and the fraction of space filled in a given structure.
- Relate molecular orbital theory to the delocalization of valence electrons in metals.
- Understand the concepts of electron wavelength and density of states.
- Understand the consequences of the nearly free electron model for the band structure of metals and their conductivity.
- Explain why some metals are magnetic and others are diamagnetic, and how these phenomena relate to bonding and orbital overlap.
- Use the Curie-Weiss law to explain the temperature dependence of magnetic ordering.
- Acquire a physical picture of different kinds of magnetic ordering and the magnetic hysteresis loops of ferro- and ferrimagnets.

It should come as no surprise that the properties of extended solids are also connected to their structures, and so to understand what they do we should begin with their crystal structures. Most of the metals in the periodic table have relatively simple structures and so this is a good place to begin.