

### 1.1.3 Required Background Knowledge

#### Mathematics

- Advanced Math as taught in all undergraduate courses should be enough. You should not be intimidated by long equations and have a feeling for the important parts in mathematical deductions.

#### General Physics and Chemistry

- A general undergraduate level of basic physics should be sufficient. You should be comfortable with units and conversion between units. Not much chemistry will be needed, but you should know, e.g., that **KOH** is a base and **HF** an acid and that **SiO<sub>2</sub>** is quartz which is pretty stable in most chemicals, and so on.

#### General Materials Science

- You must be comfortable with all crystallographic notions and the reciprocal lattice. Thermodynamics, especially in its statistical form as expressed by distribution functions, is a must. Some preliminary understanding of semiconductors - conductivity, holes and electrons, junction in general - is necessary.

#### Quantum Theory

- A good understanding of quantum theory up to the level of the free electron gas model is essential.

#### Thermodynamics

- A working knowledge of classical thermodynamics is helpful. Simple statistical thermodynamics as expressed by distribution functions is a must. Knowing in detail what "chemical potential" means would be nice, but it's not really required.