Preparatory material for incoming students: Inorganic Chemistry

1. All of the first year inorganic chemistry tutorials at St Edmund Hall will be given either by Dr Mike Laidlaw (Michaelmas term) or Professor Philip Mountford (Hilary and Trinity terms).

2. There will be two first year inorganic chemistry tutorials in Michaelmas term on or around the following topics:

   a) *Atomic structure and periodic trends*

   b) *The ionic model*

3. The inorganic chemistry lectures in Michaelmas term are as follows:

   a) *Atomic Structure and Periodic Trends* by Professor C. R. Timmel

   b) *Ionic Model and Structures of Solids* by Professors A. L. Goodwin and V Deringer.

   These lectures set up some of the basic principles you will use throughout your course. You can see that the first two tutorials closely support (and are supported by) these lecture courses. A further tutorial, *Structures of Solids*, early on in Hilary term completes the support of the Michaelmas term lectures.

4. To help prepare for your first year courses please buy *Inorganic Chemistry* by M. Weller, T. Overton, J. Rourke and F. Armstrong (2018, 7th edition, published by Oxford University Press, ISBN 978-0-19-876812-8) and read chapters 1 (*Atomic structure*) and 4 (*The structures of simple solids*) in detail. This is available on *Amazon* BUT at effectively the same price (and also usually with free delivery) you can get it on-line from Oxford's excellent, independent academic bookseller, Blackwell's (https://blackwells.co.uk/bookshop/product/Inorganic-Chemistry-by-Martin-Weller-author-Tina-Overton-author-Jonathan-Rourke-author-F-A-Armstrong-author/9780198768128). Note that in either case there is a 6th edition but this is already 5 years out of date so make sure yours is the 7th edition. This book is a helpful starting point for many of your inorganic chemistry topics for the first two years. You will be referred to a wide number of specialist books for various topics throughout your course, and these will be available in the college and university libraries. You will probably wish to buy several more of your own books as time goes on. The Oxford chemistry course is one of the best and most rigorous in the UK: you will find it goes beyond general "one-stop" university books almost all of the time. Note that College Grant funds are available to support the purchase of essential course materials, currently at the rate of *ca* £300 per year, of which £100 may be used to purchase books. Almost all of the lecturers provide very comprehensive lecture handouts to accompany their courses.

5. After having read Chapter 1 of *Inorganic Chemistry* please attempt the questions below. You do not need to hand these in when you come up to Oxford.

   a) What do the quantum numbers *n, l,* m_l and m_s represent ? What are their allowed values ?

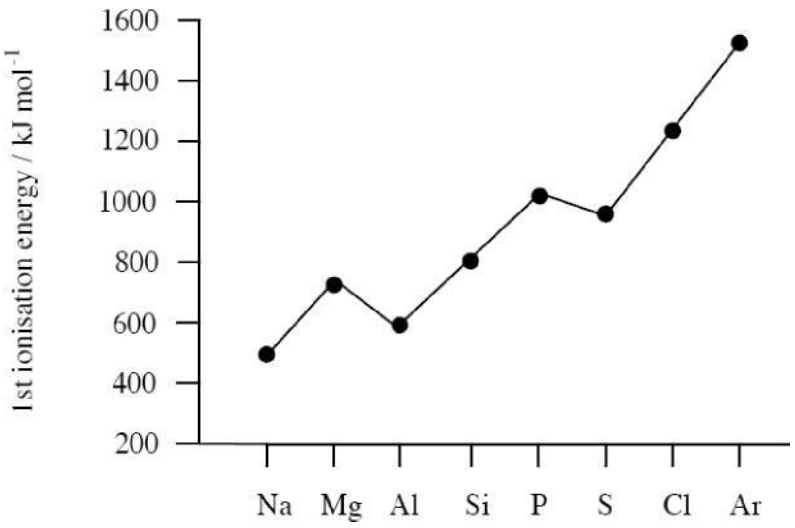
   b) What is meant by the terms "shielding", "penetration", "the inert pair effect" and "the lanthanide contraction" ? Why are these important for understanding the Periodic Table?

   c) Define the following terms: "*ionisation energy*", "*electron affinity*", "*electronegativity*". Give examples of how these vary down a group and across a row of the Periodic Table.

   d) Explain the variation in the orbital energies of the 2s and 2p orbitals in Li^{2+} and Li given in the table below (hint: think about penetration and shielding effects).

	2s (kJ mol-1)	2p (kJ mol-1)
Li^{2+}	-2,951	-2,951
Li	-520	-342

   e) Explain the variations in the first ionisation energies for the elements Na to Ar shown in the figure below. Be sure to think about the importance of *exchange energy* at the $3p^3$ and $3p^6$ maxima.



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