1. What are the possible geometries for a 4 coordinate compound?

- Pyramidal
- D$_{3h}$
- D$_{4h}$
- C$_{4v}$
- Tetrahedral
- Square pyramid
- T$_d$ The other geometries relate to other coordination environments. See page 8 of the lecture.

2. Actinides are hard metal ions

2.1. What are properties of hard metal ions

- Low Positive Charge
- Closed shells or half-filled electron configurations * High positive charges
- Large ionic radius * Small radii
- High positive charges

2.2. Lanthanides and actinides can both be classified as hard metal ions. Which are considered to be harder, lanthanides or actinides? Lanthanides

3. Identify the d orbital splitting that is classified as high spin in crystal field theory. This is for a metal ion with 4 d electrons.

High spin is also weak field. The larger number of unpaired electrons drives the higher spin configuration. The high spin is facilitated by the weaker splitting field, permitting an electron to occupy the eg orbital.

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