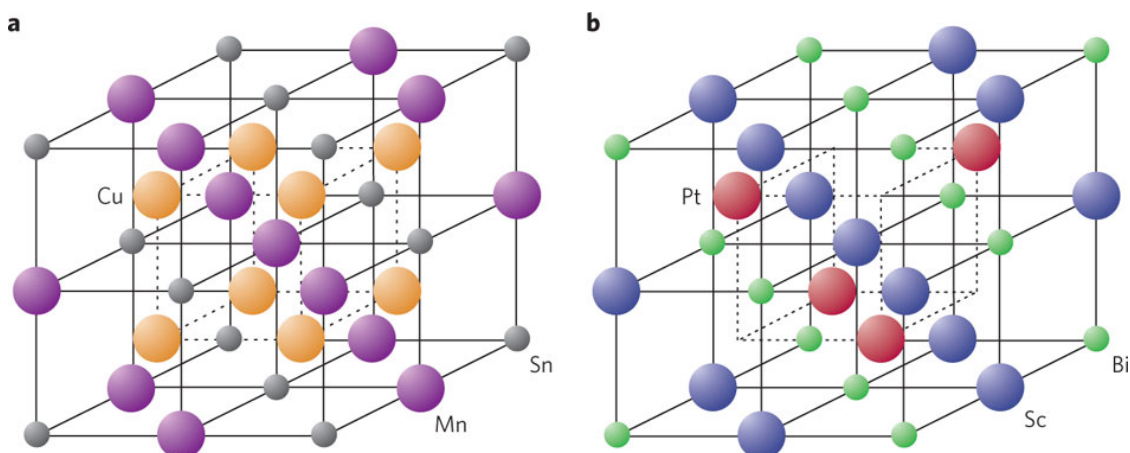


HW 1	Inorganic Materials Chemistry	Name:	
Points:	C7780	Date:	
Max. 100 points	Fall 2018	A	

1. (20 pts) In the crystalline Cu_2O , oxygen atoms possess coordination number 4. What is the coordination number of Cu? Show how you arrived to the answer.

2. (10 pts) A unit cell has in general shape of a) cube b) tetrahedron c) parallelepiped

3. (20 pts) Give stoichiometric formulas for the cubic structures in the picture below. **a** = Heusler compound, **b** = Half-Heusler compound.



4. (25 pts) An octahedral structural unit CoO_6 possesses following Co–O bond distances (in Å). Use Pauling Rules to establish whether the cobalt cation is in oxidation state 2+ or 3+. Use parameters $R_0 = 1.692 \text{ Å}$ and $B = 0.30$.

2x Co1–O1 2.1033(12)

2x Co1–O2 2.0703(12)

2x Co1–O3 2.1204(12)

5. (25 pts) Assume that CaO reacts with CeO_2 and forms CaCeO_3 . What could be the structure type of this compound? _____

Write balanced chemical equations for the reactions taking place at the interfaces I and II (assume counter diffusion of both cations) and calculate the Kirkendall ratio for this process.

	I	II	
CaO	CaCeO₃	CeO₂	