

NORTHERN ILLINOIS UNIVERSITY

PHYSICS DEPARTMENT

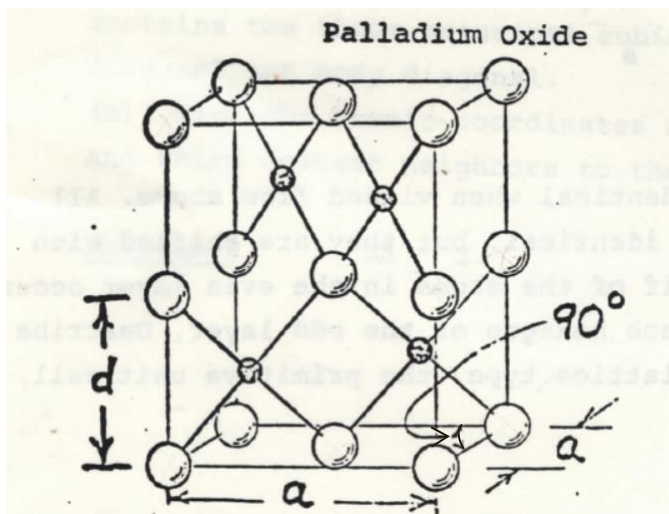
Physics 580 – Solid State Physics

Fall 2022

Problem Set #2

Problem Set Due: Tues., Sept. 6, 2022

Read Kittel: Chapter 1&2



1. The figure shows the structure of PdO. The small circles represent palladium atoms and the large circles oxygen atoms. The PdO_4 groups are planar.
 - (a) What is the lattice type?
 - (b) Indicate the primitive unit cell, and give a set of primitive translation vectors for both the lattice shown above and for the primitive unit cell.
 - (c) How many atoms are in a primitive unit cell? Give the coordinates of the basis atoms for the lattice shown above and for the primitive unit cell.
 - (d) Give the Miller indices for a plane which contains planar PdO_4 groups for the lattice shown above and for the primitive unit cell.

2. Calcium Fluorite, CaF_2 , has a structure based on the fcc lattice and a basis with Ca at $0\ 0\ 0$ and F's at $\frac{1}{4}\ \frac{1}{4}\ \frac{1}{4}$ and $\frac{3}{4}\ \frac{3}{4}\ \frac{3}{4}$. Draw a projection diagram and sketch one conventional (cubic) cell of the structure.