X-Ray Diffraction: Determining the distance between planes of atoms

X-rays and atoms
Orders of diffraction

Bragg's Law

$$2d\sin\theta = n\lambda$$

Using X-Ray Diffraction: Bragg's Law

Platinum metal crystallizes in a **face-centered** cubic lattice with one atom per lattice point. Monochromatic X-radiation from a **Mo** target has a wavelength of **71.07** pm. If this radiation is used in a diffraction experiment with a **platinum** crystal, a second order diffracted beam is observed at a theta value of **10.43°**. If the spacing between these planes corresponds to the unit cell length (d = *a*), what is the d-spacing between the planes that gave rise to this reflection?

$$2d\sin\theta = n\lambda$$

? $\quad$ 10.43° $\quad$ 2 $\quad$ 71.07 pm

$$d = \frac{n\lambda}{2\sin\theta} = \frac{2(71.07\text{ pm})}{2(0.181)} = 393\text{ pm}$$

1st exam

2nd exam

Chapter 13: Mixtures: solutions, complex mixtures, colligative properties

Colligative Properties ⇝ { – what things mix together?
– why?
– properties of solutions