

ME 301: HW Assignment 2 – (50 points)

- (a) Calculate the attractive force ($\bullet \rightarrow \leftarrow \bullet$) between a pair of K^+ and Br^- ions that just touch each other. Assume the ionic radius of the K^+ ion to be 0.133 nm and that of the Br^- ion to be 0.196 nm. **(10 points)**

(b) Calculate the net potential energy for the $\text{K}^+ \text{Br}^-$ pair by using the b constant calculated from part (a). Assume $n = 9.5$. **(10 points)**
- If the attractive force between a pair of Sr^{2+} and O^{2-} ions is 1.29×10^{-8} N and the ionic radius of the O^{2-} ion is 0.132 nm, calculate the ionic radius of the Sr^{2+} ion in nanometers. **(10 points)**
- Why is diamond such a hard material? Explain with a figure. **(5+5 = 10 points)**
- Calculate values for the percent metallic and covalent bonding in the structural metal titanium. Assume covalent-metallitvity of Ti is 1.91. **(5 points)**
- Compare the percentage ionic character in the semiconducting compounds CdTe and InP. Use an appropriate figure from Chapter 2 for your calculations. **(5 points)**