Question #48957, Chemistry, Inorganic Chemistry

Question:

Determine the first three energy levels 3 of an electron confined to a one dimensional box of length of 10^{-9} M.

Answer:

$$E_1 = \frac{h^2}{8mL^2} = \frac{\left(6.63 \cdot 10^{-34}\, J \cdot s\right)^2}{8 \times 9.1 \cdot 10^{-31} kg \times \left(10^{-9}\, m\right)^2} = 6.04 \cdot 10^{-17}\, J$$

$$E_2 = 2^2 E_1 = 4 \times 6.04 \cdot 10^{-17}\, J = 2.42 \cdot 10^{-16}\, J$$

$$E_3 = 3^2 E_1 = 9 \times 6.04 \cdot 10^{-17}\, J = 5.43 \cdot 10^{-16}\, J$$