

5. (a) From Table 2-1, we have $v^2 = v_0^2 + 2a\Delta x$. Thus,

$$v = \sqrt{v_0^2 + 2a\Delta x} = \sqrt{(2.4 \times 10^7)^2 + 2(3.6 \times 10^{15})(0.035)} = 2.9 \times 10^7 \text{ m/s} .$$

- (b) The initial kinetic energy is

$$K_i = \frac{1}{2}mv_0^2 = \frac{1}{2}(1.67 \times 10^{-27} \text{ kg})(2.4 \times 10^7 \text{ m/s})^2 = 4.8 \times 10^{-13} \text{ J} .$$

The final kinetic energy is

$$K_f = \frac{1}{2}mv^2 = \frac{1}{2}(1.67 \times 10^{-27} \text{ kg})(2.9 \times 10^7 \text{ m/s})^2 = 6.9 \times 10^{-13} \text{ J} .$$

The change in kinetic energy is $\Delta K = 6.9 \times 10^{-13} - 4.8 \times 10^{-13} = 2.1 \times 10^{-13} \text{ J}$.