

Atomic Theory

Name: _____

Show all work. Use scientific notation for any numbers over 1000.

1) Sodium vapor lamps are used for public lighting and emit yellow light at a wavelength of 589 nm. How much energy is emitted by:

a) an excited sodium atom when it emits a photon

b) 1 mol of sodium atoms emitting at this wavelength

2. The work function for chromium metal is 4.37 eV. What wavelength of radiation must be used to eject electrons with a velocity of 1.5×10^3 km/s? (1 eV = 1.602×10^{-19} J)

Atomic Theory

3. The velocity of an electron emitted from a metallic surface by a photon is 3.6×10^{-3} km/s.

a) What is the wavelength of the emitted electron?

b) No electrons are emitted from the metal until the frequency of the radiation reaches 2.50×10^{16} Hz. How much energy is required to remove the electron from the metal surface?

c) What is the wavelength of radiation needed to eject the electron?

d) What range of electromagnetic radiation does this radiation fall into?