

15 A student used two sources, A and B, of electromagnetic radiation to investigate the photoelectric effect. Radiation from A has a photon energy of  $2.0\text{ eV}$ .

(a) The radiation from B has a wavelength of  $280\text{ nm}$ .

Show that this radiation has a photon energy of about  $4.4\text{ eV}$ .

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- \*(b) The student used the two sources of radiation to investigate the photoelectric effect for two different metals, copper and zinc.

The following statements were made by the student.

When radiation of photon energy 2.0 eV from source A is directed towards either of the metal plates no electrons are released, even when the intensity of the radiation is increased.

When radiation of photon energy 4.4 eV from source B is directed towards the copper plate, no electrons are released. However, when the radiation is directed towards the zinc plate, electrons are released. As the intensity of radiation is increased, electrons are released at a greater rate.

Explain the conclusions that can be made from these statements.

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