Comparing Light Output per Absorbed Photon

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A display gives two coatings the same number of absorbed photons. Each incoming photon brings five model energy units. A coating can give back some of that energy as emitted light. In each row all emitted photons have the stated energy.

Coating	Absorbed photons	Emitted photons	Energy per emitted photon
P	20	12	2
Q	20	8	3

1 Which coating emits more photons per absorbed photon?

(1) P only

(2) Q only

(3) Both emit the same fraction.

(4) The numbers cannot be compared.

2 Calculate the energy emitted as light by each coating. [1]

Answer and work

3 A student says a meter that reports equal emitted energy proves the two coatings emit equal photon counts. Evaluate the claim with the table. [1]

Answer and work

A second detector collects one quarter of the light emitted by P and one half of the light emitted by Q. The detector does not change either coating’s emission.

4 Predict the energy this detector collects from each coating. Explain how to recover the total emitted energy from these new readings. [1]

Answer and work