Diagnosing a Reflection in a Model IR Reading

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

A class tests an infrared detector for a museum display. It observes two opaque panels, one matte and one polished. The detector receives infrared radiation emitted by a panel and radiation reflected from its surface. The class compares the readings with a warm screen visible to the panels and with the screen covered.

Panel	Contact temperature in both trials (°C)	Infrared signal with screen covered	Infrared signal with screen uncovered
Matte	30	40	41
Polished	30	30	48

1 Which evidence best supports the idea that the uncovered screen adds reflected radiation to the detector?

(1) Both panels have a contact temperature of 30 °C.

(2) The polished panel gives a larger signal when uncovered, but its contact temperature does not change.

(3) Both panels emit infrared radiation when the screen is covered.

(4) The covered screen makes both panels colder.

2 Calculate the change in the signal for each panel when the screen is uncovered. [1]

Answer and work

The display team wants to track changes in a panel’s own emission as it warms. A person standing near the detector could become an extra source of reflected infrared radiation.

3 Based on the screen test, which panel gives the team a reading less affected by a change in nearby infrared sources? Use both results. [1]

Answer and work

4 Describe how a contact thermometer could help the team distinguish actual warming from an effect of someone walking nearby. [1]

Answer and work