Reading Current Along Graphite Layers

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

A materials exhibit uses graphite and copper cubes with the same dimensions. The graphite carbon atoms form flat layers parallel to one pair of faces. In the model, charge moves more easily along a layer than across stacked layers. Both routes conduct. Identical contacts are mounted on pairs of opposite faces to keep path length and area matched.

Specimen and contact direction	**Current at the same voltage (mA)**
Graphite with contacts along the layers	12
Graphite with contacts across the layers	2
Copper in the first direction	18
Copper in the perpendicular direction	18

1 Which pair directly shows that the current depends on the contact direction in graphite?

(1) The two graphite readings

(2) The two copper readings

(3) Both first-direction readings

(4) Both second-direction readings

2 A student says a graphite piece with the smaller current has no moving charge between its contacts. Use the current record to evaluate the claim. [1]

Answer and work

An unknown graphite cube has the same dimensions as the earlier graphite. The class uses the same voltage and contacts. One pair of opposite faces gives 2 mA. The perpendicular pair gives 12 mA.

3 Identify which contact placement sends charge mainly along the graphite layers. Explain how the reference readings help. [1]

Answer and work

4 The class tests a rectangular piece with different contact separations for the two directions. Explain why that comparison is weaker and describe a change that controls for path geometry. [1]

Answer and work