Checking Particle Identity After Heating

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

A classroom model heats two solids in separate sealed containers. Each begins with just one kind of molecule in its solid sample. The display identifies particles in the solid and in any gas that appears. Each container is then cooled to its starting temperature.

Sample	Molecules before heating	Molecules in gas during heating	Particles present after cooling
P	AB_2	AB_2	AB_2 only
Q	CD_2	D_2	C and D_2

1 Which gas record can be explained by intact molecules moving apart and entering the gas phase?

(1) P only

(2) Q only

(3) Both records

(4) Neither record

2 Use both records to explain why seeing a gas is insufficient to identify a chemical change. [1]

Answer and work

A repeat starts with 12 CD_2 molecules. Every CD_2 breaks into one C particle and one D_2 molecule in this model. The container stays sealed.

3 Predict the number of D_2 molecules after the repeat and compare the total number of D atoms before and after. [1]

Answer and work

4 A student says that because the D atom count is unchanged, the process must be a physical change. Evaluate the claim. [1]

Answer and work