Checking Melting After a Heater Switches Off

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

A display warms a metal backing in contact with a small solid sample. The sample is at its melting temperature. Once the heater switches off, the insulated model allows energy transfer only from the backing to the sample. Melting one gram of the sample takes 30 J.

Observation interval	Electrical energy supplied (J)	New mass melted (g)
Before the switch	120	2
After the switch	0	1

1 Which observation directly shows that melting continues after the switch?

(1) The first electrical reading

(2) The zero electrical reading by itself

(3) The one gram of new liquid in the second interval

(4) The two grams in the first interval

2 Find the energy transferred to the sample for melting during the interval after the switch. [1]

Answer and work

3 A student says zero electrical input means no energy can reach the sample. Explain how the backing can account for the melting. [1]

Answer and work

An independent sensor shows that the backing loses 30 J after the switch. In a repeat an insulating spacer slows heat transfer from the backing, and only 0.5 g melts during the same time interval.

4 Find how much energy reaches the sample in the repeat. Compare that transfer with the original interval. [1]

Answer and work