

Calculate the entropy change in the system if 20J heat observed by the system at constant temperature 10 degrees celcius

Solution

Clausius defined the change in entropy of a thermodynamic system (dS), during a reversible process, as:

$$dS = \frac{\delta Q}{T}$$

where

δQ is a small amount of heat introduced reversibly to the system,

T is a constant absolute temperature (in kelvins).

We are given:

$$\delta Q = 20J$$

$$T = 10^\circ C = 283.15 K$$

Thus:

$$dS = \frac{\delta Q}{T} = \frac{20}{283.15} \approx 0.071 \frac{J}{K}$$

Answer: 0.071 J/K