

## Adsorption.

(1)

Rate of physisorption increases with

- a) decrease in temperature
- b) increase in temperature
- c) decrease in pressure
- d) decrease in surface area

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During the adsorption of a gas on the surface of a solid, which of the following is true?

- a)  $\Delta G < 0$ ,  $\Delta H > 0$ ,  $\Delta S < 0$
- b)  $\Delta G > 0$ ,  $\Delta H < 0$ ,  $\Delta S < 0$
- c)  $\Delta G < 0$ ,  $\Delta H < 0$ ,  $\Delta S < 0$
- d)  $\Delta G < 0$ ,  $\Delta H < 0$ ,  $\Delta S > 0$

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Ans: (c) Adsorption is exothermic  $\therefore \Delta H = -ve$

Freedom of movement of particles become restricted  $\therefore \Delta S = -ve$

Since the process of adsorption is spontaneous,  $\Delta G = -ve$

$$\begin{aligned}\Delta G &= \Delta H - T\Delta S \\ &= -\Delta H - T(-\Delta S) \\ &= -\Delta H + T\Delta S\end{aligned}$$

$$\Delta H > T\Delta S$$

Spontaneous

② Which of the following statements is <sup>②</sup> incorrect regarding physisorption? AIEEE 09

- a) It occurs because of Van der Waals forces
- b) More easily liquefiable gases are adsorbed readily.
- c) Under high pressure it results into multimolecular layer on adsorbent surface.
- d) ~~Enthalpy of adsorption is low & positive.~~

④ A plot of  $\log \frac{x}{m}$  vs  $\log p$  for the adsorption of a gas on a solid gives a straight line with slope equal to

a)  $n$       ~~b)  $\frac{1}{n}$~~       c)  $\log k$       d)  $-\log k$

$$\frac{x}{m} \propto p^{1/n}$$

$$\frac{x}{m} = k p^{1/n}$$

$$\log \frac{x}{m} = \log k + \frac{1}{n} \log p$$



