

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 ^② 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) $-\log k$

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

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

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



