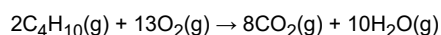


Enthalpy (2021 VCE)

1) Butane, C_4H_{10} , undergoes complete combustion according to the following equation.



67.0 g of C_4H_{10} released 3330 kJ of energy during complete combustion at standard laboratory conditions (SLC). The mass of carbon dioxide, CO_2 , produced was

- A. 0.105 g
- B. 3.18 g
- C. 50.9 g
- D. 204 g

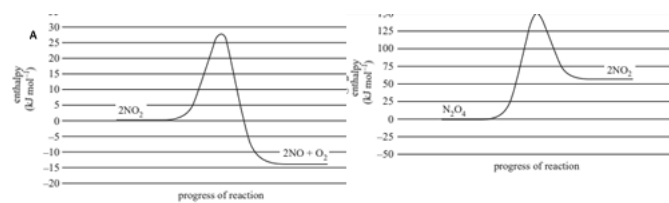
[Solution](#)

Solution will appear here

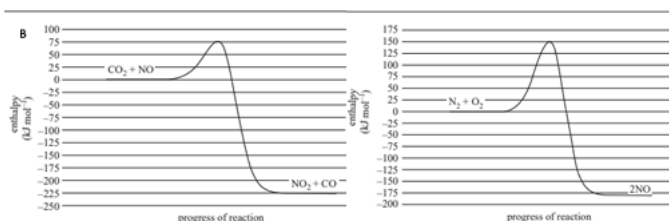
2) Consider the following chemical equations.



Which one of the following graphs is consistent with the chemical equations above?



Solution will appear here



[Solution](#)

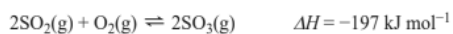
3) Which one of the following statements describes the effect that adding a catalyst will have on the energy profile diagram for an exothermic reaction?

- A. The energy of the products will remain the same.
- B. The shape of the energy profile diagram will remain the same.
- C. The peak of the energy profile will move to the left as the reaction rate increases.
- D. The activation energy will be lowered by the same proportion in the forward and reverse reactions.

Solution will appear here

[Solution](#)

4) The reaction for the oxidation of sulfur dioxide, SO_2 , is shown below.

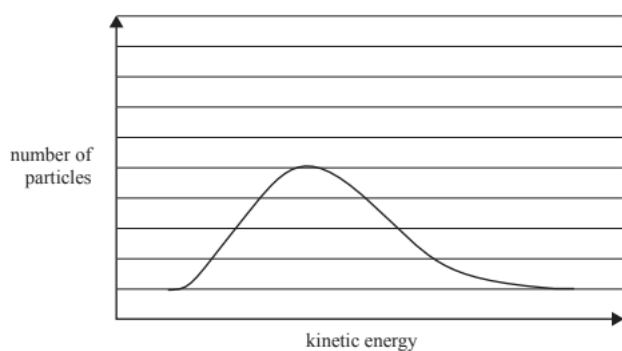


a. 1.00 mol of SO_2 and 1.00 mol of oxygen, O_2 , are placed into an evacuated, sealed 3.00 L container at 100°C . After the reaction reaches equilibrium, the container contains 20.0 g of sulfur trioxide, SO_3 . Calculate the equilibrium constant, K_c , for this reaction at 100°C .

Solution will appear here

Solution

b. The graph below shows the Maxwell-Boltzmann distribution curve for the SO_3 molecules in the container at a particular temperature. On the graph, draw the Maxwell-Boltzmann distribution curve of SO_3 at a significantly lower temperature.



Solution will appear here

Solution

c. The volume of the closed container is doubled. Describe the effect that this has on the concentration of SO_2 from the time just before the volume was changed until after the system re-established its equilibrium.

Solution