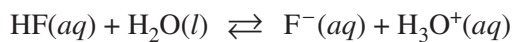


2018 AP[®] CHEMISTRY FREE-RESPONSE QUESTIONS



5. The ionization of $\text{HF}(aq)$ in water is represented by the equation above. In a 0.0350 M $\text{HF}(aq)$ solution, the percent ionization of HF is 13.0 percent.

- (a) Two particulate representations of the ionization of HF molecules in the 0.0350 M $\text{HF}(aq)$ solution are shown below in Figure 1 and Figure 2. Water molecules are not shown. Explain why the representation of the ionization of HF molecules in water in Figure 1 is more accurate than the representation in Figure 2. (The key below identifies the particles in the representations.)

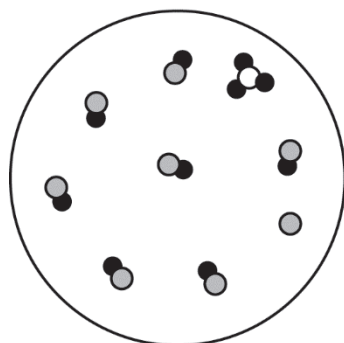
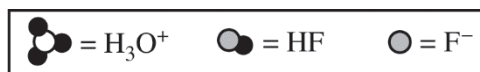


Figure 1

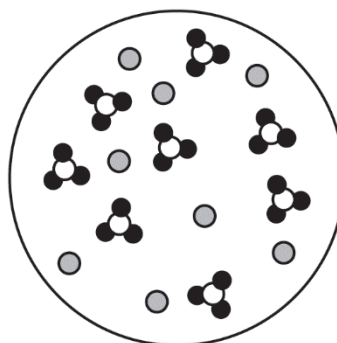


Figure 2

- (b) Use the percent ionization data above to calculate the value of K_a for HF .
- (c) If 50.0 mL of distilled water is added to 50.0 mL of 0.035 M $\text{HF}(aq)$, will the percent ionization of $\text{HF}(aq)$ in the solution increase, decrease, or remain the same? Justify your answer with an explanation or calculation.