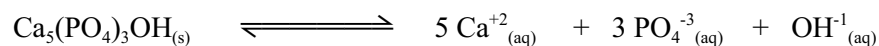


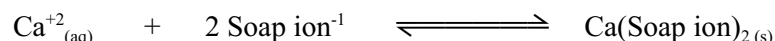
## Assignment: Application of Equilibrium

SCH4U 04-05

1. Is sugar candy really bad for your teeth? Tooth decay is the result of the dissolving of tooth enamel,  $\text{Ca}_5(\text{PO}_4)_3\text{OH}_{(s)}$ . In the mouth the following equilibrium is established ...

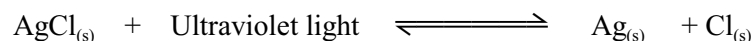


- a) When sugar ferments on the teeth,  $\text{H}^+$  ion is produced. What effect does this increased  $\text{H}^+$  ion have on tooth enamel?
- b) How would increased concentrations of  $\text{Ca}^{+2}$  ions influence this system in chemical equilibrium? Suggest a method to increase the  $\text{Ca}^{+2}$  ion concentration in your body.
- c) Research has indicated that if teeth are bathed in solutions containing appropriate amounts of  $\text{Sr}^{+2}$  ions or  $\text{F}^{-1}$  ions, the dissolving process may be reversed. Suggest an explanation for these findings.
2. The following equilibrium takes place when soap ions are dissolved in hard water, i.e. water containing calcium ions,  $\text{Ca}^{+2}$ :



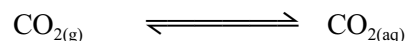
The solid formed is better known as a “bath-tub-ring”. Explain the effect of decreasing the concentration of the calcium ion.

3. The following equilibrium occurs in eyeglasses that automatically darken when exposed to intense sunlight:



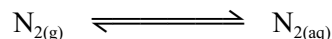
Explain the effect of increasing the increasing the amount of ultraviolet light energy.

4. The following equilibrium is present is in carbonated soft drinks:



Explain the effect of increasing the temperature.

5. In scuba divers, high levels of nitrogen dissolved in the bloodstream can lead to a fatal conditions known as ‘nitrogen narcosis’, or ‘rapture of the deep’, also known as ‘the bends’. The following equilibrium occurs when nitrogen dissolves in the blood stream:



Predict the effect of increasing the pressure.