

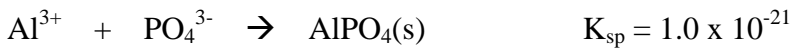
The most common Chemical Reactions involved in **Tertiary Treatment** are as follows:

**1) Coagulation of suspended solids with Alum Flocc**

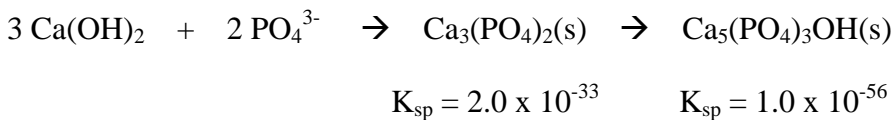
Alum is  $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24 H_2O$  and provides a source of  $Al^{3+}$  ions. In the pH range of 5 – 6, alum forms a gelatinous network polymer flocc.

$Al^{3+} +$  negatively charged colloids  $\rightarrow$  settleable flocc

$Al^{3+}$  also forms a highly insoluble precipitate with  $PO_4^{3-}$



**2) Lime ( $Ca(OH)_2$ ) is also used to remove phosphates by simultaneously raising the pH and increasing the  $[Ca^{2+}]$ .**



Effluent is neutralized with  $CO_2(g)$  prior to release.

**3) Iron (III) chloride also precipitates phosphates and removes colloids.**



The originally formed iron (III) phosphate is reduced to iron (II) phosphate under anaerobic conditions present in the sludge.