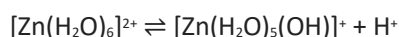


## Hydrolysis of salts (See the book for more details)

### More examples of acidic ions:

#### 1.) Dissociation and hydrolysis of zinc sulfate: $\text{ZnSO}_4 (\text{s}) = \text{Zn}^{2+} (\text{aq}) + \text{SO}_4^{2-} (\text{aq})$

In aqueous solution of zinc salts, an octahedral complex,  $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$  is the predominant species. Aqueous solutions of zinc salts are mildly acidic because the aqua-ion is subject to **hydrolysis**:



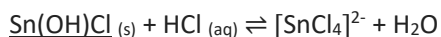
#### 2.) Hydrolysis of tin(II) chloride results in the formation of an insoluble basic salt:



Therefore, if clear solutions of tin(II) chloride are to be used, it must be dissolved in hydrochloric acid to maintain the equilibrium towards the left-hand side (using Le Chatelier's principle).

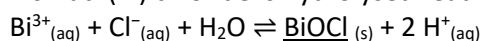
(Chatelier's principle or "The Equilibrium Law", can be used to predict the effect of a change in conditions on some chemical equilibria. It can be stated as: "When any system at equilibrium for a long period of time is subjected to change in concentration, temperature, volume, or pressure, then the system readjusts itself to partly counteract the effect of the applied change and a new equilibrium is established.")

Addition of hydrochloric acid enhances the formation of chlorocomplexes:

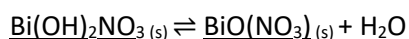
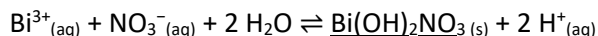


#### 3.) Hydrolysis of bismuth chloride and bismuth nitrate:

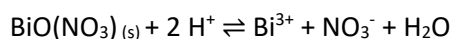
Bismuth(III) chloride is hydrolysed readily to bismuth oxychloride:



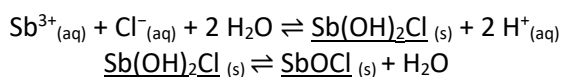
Bismuth(III) nitrate is readily hydrolysed to form a range of oxynitrates:



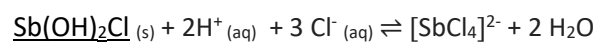
Addition of acid enhances the dissolution through acid-base reaction:



#### 4.) Hydrolysis of antimony trichloride:



Addition of hydrochloric acid enhances the formation of chlorocomplexes:



**Exercises:**



- a. Identify which of these is the conjugate base and which is the weak acid.
- b. Does the weak acid hydrolyse?

**Solution:**

- a. The conjugate base is the  $\text{HCO}_3^-$ . The weak acid is the  $\text{H}_2\text{CO}_3$ .
- b. Yes it hydrolyses.