Acid Base Properties of Salts

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| **Type of Salt** | **Examples** | **Comment** | **pH of Solution** |
| Cation is from a strong base, anion from a weak acid | NaC2H3O2KCN, NaF | Cation is neutral,Anion is basic | Basic |
| **The basic anion can accept a proton from water:** |
| C2H3O2 − +  | H2O | ⮀ | HC2H3O2 + | OH− |
| *Base*  | *acid*  |  | *acid* | *base* |
|  |  |  |  |  |
| Cation is the conjugate acid of a weak base, anion is from a strong acid | NH4Cl,NH4NO3 | Cation is acidic,Anion is neutral | Acidic |
| **The acidic cation can act as a proton donor:** |
| NH4+(aq) | ⮀ | NH3(aq) + | H+(aq) |
| Acid |  | Conjugate base | Proton |
|  |  |  |  |
| Cation is the conjugate acid of a weak base, anion is conjugate base of a weak acid | NH4C2H3O2NH4CN | Cation is acidic,Anion is basic | See below |
| * IF *Ka* for the acidic ion is greater than *Kb* for the basic **ion**, the solution is acidic
* IF *Kb* for the basic ion is greater than *Ka* for the acidic **ion**, the solution is basic
* IF *Kb* for the basic ion is equal to *Ka* for the acidic ion, the solution is neutral
 |
|  |  |  |  |
| Cation is a highly charged metal ion; Anion is from strong acid | Al(NO3)3FeCl3 | Hydrated cation acts as an acid; Anion is neutral | Acidic |
| **Step #1:** |
| AlCl3(s) + | 6H2O | → | Al(H2O)63+(aq) | + Cl-(aq) |
| Salt | Water |  | Complex Ion | Anion |
|  |  |  |  |
| **Step #2:** |  |  |  |
| Al(H2O)63+(aq) | → | Al(OH)(H2O)52+(aq) | + H+(aq) |
| Acid |  | Conjugate Base | Proton |

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| Cation is from a strong base, anion from a weak acid | NaC2H3O2KCN, NaF | Cation is neutral,Anion is basic | Basic |
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| C2H3O2 − +  | H2O | ⮀ | HC2H3O2 + | OH− |
| *Base*  | *acid*  |  | *acid* | *base* |
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| Cation is the conjugate acid of a weak base, anion is from a strong acid | NH4Cl,NH4NO3 | Cation is acidic,Anion is neutral | Acidic |
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| NH4+(aq) | ⮀ | NH3(aq) + | H+(aq) |
| Acid |  | Conjugate base | Proton |
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| Cation is a highly charged metal ion; Anion is from strong acid | Al(NO3)3FeCl3 | Hydrated cation acts as an acid; Anion is neutral | Acidic |
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| Salt | Water |  | Complex Ion | Anion |
|  |  |  |  |
| **Step #2:** |  |  |  |
| Al(H2O)63+(aq) | → | Al(OH)(H2O)52+(aq) | + H+(aq) |
| Acid |  | Conjugate Base | Proton |