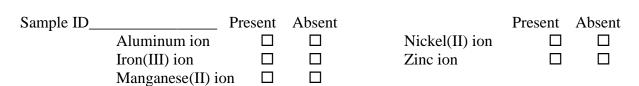
Date Section



Complete and balance the following as net ionic equations. The first one has been completed for you. If the reaction takes place in two steps (precipitation, complexation with excess reagent), give each equation. [Hint: Extra space is provided for a possible second reaction.]

Reactions with ammonium hydroxide

$$Al^{3+}_{(aq)} + 3 NH_{3(aq)} + 3H_2O_{(l)} \rightarrow Al(OH)_{3(s)} + 3NH_4^{+}_{(aq)}$$
or
$$Al^{3+}_{(aq)} + 3NH_4OH_{(aq)} \rightarrow Al(OH)_{3(s)} + 3NH_4^{+}_{(aq)}$$

$$Fe^{3+}_{(aq)} +$$

$$Mn^{2+}_{(aq)} +$$

$$Ni^{2+}_{(aq)} +$$

$$Zn^{2+}_{(aq)} +$$

Reactions with sodium hydroxide

 $OH^{-}(aq)$

$$Fe^{3+}_{(aq)} + OH^{-}_{(aq)}$$
 $Mn^{2+}_{(aq)} + OH^{-}_{(aq)}$
 $Ni^{2+}_{(aq)} + OH^{-}_{(aq)}$
 $Zn^{2+}_{(aq)} + OH^{-}_{(aq)}$

Other reactions

 $Al^{3+}(aq) +$

$$Mn(OH)_{2(s)} + H_3O^+_{(aq)}$$
 $Fe(OH)_{3(s)} + H_3O^+_{(aq)}$
 $Ni(OH)_{2(s)} + H_3O^+_{(aq)}$
 $Fe^{3+}_{(aq)} + SCN^-_{(aq)}$
 $Ni^{2+}_{(aq)} + H_2DMG_{(aq)}$
 $\rightarrow Ni(HDMG)_{2(s)}$
 $Zn^{2+}_{(aq)} + HS^-_{(aq)}$
 $\rightarrow HS^-_{(aq)}$