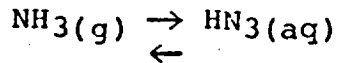


raise and maintain a higher pH through the conversion of  $\text{HN}_3$  to  $\text{NH}_4^+$ :

1. Ambient gaseous  $\text{NH}_3(\text{g})$  dissolves in the water,



2. The dissolved  $\text{NH}_3(\text{aq})$  reacts with  $\text{H}^+$ , which raises the pH  $\text{NH}_3(\text{aq}) + \text{H}^+ \rightarrow \text{NH}_4^+$ .

Therefore, the ambient pathways of auto-oxidation, Mn(II)- and Fe(III)- catalyzed oxidation, and  $\text{O}_3$  oxidation would have their rates enhanced by absorption of  $\text{NH}_3$ . However, the ambient pathways of  $\text{H}_2\text{O}_2$  and  $\text{HNO}_2$  would have their rates retarded by  $\text{NH}_3$  absorption. The rate for soot would not be influenced.

$\text{NH}_3$  can play other important roles. Reinders and Vles (1925) observed qualitatively that Cu(II) was complexed by  $\text{NH}_3$  and rendered non-catalytic. At high pH's (>9) such that  $\text{NH}_3(\text{aq})$  is the dominant form,  $\text{NH}_3$  is explained in terms of its influence on the pH of the water system;  $\text{NH}_3$  is not a catalyst.

### 2.3.5 Surface Chemical Reactions

Industrial emissions of solid particles (e.g., fly ash) and fugitive dust (e.g., windblown soil and minerals) provide a solid-surface that may chemisorb  $\text{SO}_2$  and yield sulfate ions. The work reviewed in this section will include investigations of the  $\text{SO}_2$  oxidation on the surfaces of: metal oxides, fly ash, charcoal, and soot. Although reaction kinetics have not been identified, two general types of processes have been: a capacity-limited reaction for  $\text{SO}_2$  removal and a catalytic  $\text{SO}_2$