

Figure 9.9. Proton catalysis of the dissolution rate of aluminum oxide. The logarithm of the dissolution rate, R_{H} , is plotted as a function of pH (A) and the logarithm of the surface concentration of hydrogen ion, C_{H}^{s} (B). The non-integral rate with respect to pH (A) but nearly integral rate with respect to $\log C_{\text{H}}^{\text{s}}$ is common in mineral dissolution reactions. A schematic representation of the four steps proposed to explain the data in (A) and (B) is presented in (C). The first three steps are surface proton exchange reactions and are followed by the rate-determining detachment of the metal from the surface. Adapted from Furrer and Stumm (1986).

