

Table 1

Mechanism of ozone decomposition in aqueous solutions

| | Reaction | Rate constants in M, s units | Ref. |
|-------|--|---|-------|
| 1a | $O_3 + OH^- \rightarrow \bullet O_3^- + \bullet OH$ | $k_1 = \Sigma k_{1i} = 70$ | 12,65 |
| 1b | $O_3 + OH^- \rightarrow HO_2\bullet + \bullet O_2^-$ | | |
| 1c | $O_3 + OH^- \rightarrow HO_2^- + O_2$ | | |
| 2a | $O_3 + HO_2^- \rightarrow HO_3^- + O_2$ | $k_2 = \Sigma k_{2i} = 2.8 \times 10^6$ | 12,65 |
| 2b | $O_3 + HO_2^- \rightarrow HO_3\bullet + \bullet O_2^-$ | | |
| 2c | $O_3 + HO_2^- \rightarrow OH^- + 2 O_2$ | | |
| 3,4 | $H_2O_2 \rightleftharpoons HO_2^- + H^+$ | $k_3 = 7.9 \times 10^{-2}; k_4 = 5.0 \times 10^{10}$ | 27 |
| 5 | $O_3 + \bullet OH \rightarrow HO_2\bullet + O_2$ | $k_5 = 1.1 \times 10^8$ | 33,65 |
| 6 | $H_2O_2 + \bullet OH \rightarrow HO_2\bullet + H_2O$ | $k_6 = 2.7 \times 10^7$ | 33 |
| 7 | $HO_2^- + \bullet OH \rightarrow HO_2\bullet + OH^-$ | $k_7 = 7.5 \times 10^9$ | 33 |
| 8,9 | $HO_2\bullet \rightleftharpoons \bullet O_2^- + H^+$ | $k_8 = 7.9 \times 10^5; k_9 = 5 \times 10^{10}$ | 23 |
| 10 | $O_3 + \bullet O_2^- \rightarrow \bullet O_3^- + O_2$ | $k_{10} = 1.6 \times 10^9$ | 33 |
| 11,12 | $HO_3\bullet \rightleftharpoons \bullet O_3^- + H^+$ | $k_{11} = 3.3 \times 10^2; k_{12} = 5.2 \times 10^{10}$ | 12 |
| 13 | $HO_3\bullet \rightarrow \bullet OH + O_2$ | $k_{13} = 1.4 \times 10^5$ | 12 |
| 14 | $\bullet OH + HCO_3^- \rightarrow H_2O + CO_3\bullet^-$ | $k_{14} = 1.2 \times 10^7$ | 33 |
| 15 | $CO_3\bullet^- + HO_2^- \rightarrow CO_3^{2-} + HO_2\bullet$ | $k_{15} = 3.0 \times 10^7$ | 33 |
| 16 | $CO_3\bullet^- + H_2O_2 \rightarrow HCO_3^- + HO_2\bullet$ | $k_{16} = 4.3 \times 10^5$ | 33 |
| 17 | $\bullet OH + \bullet OH \rightarrow H_2O_2$ | $k_{17} = 6.0 \times 10^9$ | 33 |
| 18 | $\bullet OH + \bullet O_2^- \rightarrow O_2 + OH^-$ | $k_{18} = 1.1 \times 10^{10}$ | 33 |
| 19 | $HO_2\bullet + HO_2\bullet \rightarrow H_2O_2 + O_2$ | $k_{19} = 9.8 \times 10^5$ | 33 |
| 20 | $\bullet OH + HO_2\bullet \rightarrow H_2O + O_2$ | $k_{20} = 1.0 \times 10^{10}$ | 33 |
| 21 | $HO_2\bullet + \bullet O_2^- \rightarrow HO_2^- + O_2$ | $k_{21} = 9.7 \times 10^7$ | 33 |
| 22 | $CO_3\bullet^- + CO_3\bullet^- \rightarrow CO_2 + CO_4^{2-}$ | $k_{22} = 2.0 \times 10^7$ | 33 |
| 23 | $CO_3\bullet^- + O_3 \rightarrow$ | $k_{23} = 1.0 \times 10^5$ | 33 |
| 24 | $CO_3\bullet^- + \bullet O_2^- \rightarrow O_2 + CO_3^{2-}$ | $k_{24} = 6.5 \times 10^8$ | 33 |
| 25 | $CO_3\bullet^- + \bullet OH \rightarrow HCO_4^-$ | $k_{25} = 3.0 \times 10^9$ | 33 |