<table>
<thead>
<tr>
<th>Reactions</th>
<th>Rate coefficients (cm$^3$ s$^{-1}$, s$^{-1}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>O$^+$ + O$_2$ $\rightarrow$ O$_2^+$ + O</td>
<td>$\gamma = 2.82 \times 10^{-11} - 7.74 \times 10^{-12}(T_{\text{eff}}/300) + 1.07 \times 10^{-12}(T_{\text{eff}}/300)^2$ $- 5.17 \times 10^{-14}(T_{\text{eff}}/300)^3 + 9.65 \times 10^{-16}(T_{\text{eff}}/300)^4$</td>
</tr>
<tr>
<td>O($^1D$) + N$_2$ $\rightarrow$ O + N$_2$</td>
<td>$k_1 = 2 \times 10^{-11}\exp(107.8/T_n)$</td>
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<tr>
<td>O($^1D$) + O$_2$ $\rightarrow$ O + O$_2$</td>
<td>$k_2 = 2.9 \times 10^{-11}\exp(67.5/T_n)$</td>
</tr>
<tr>
<td>O($^1D$) + O $\rightarrow$ O + O</td>
<td>$k_3 = (3.73 + 1.1965 \times 10^{-1} T_n^{0.5} - 6.5898 \times 10^{-4} T_n) \times 10^{-12}$</td>
</tr>
<tr>
<td>O($^1D$) $\rightarrow$ O $+$ hv(630.0 nm)</td>
<td>$A_{1D} = 7.1 \times 10^{-3}$</td>
</tr>
<tr>
<td>O($^1D$) $\rightarrow$ O $+$ hv(634.4 nm)</td>
<td>$A_{2D} = 2.2 \times 10^{-3}$</td>
</tr>
</tbody>
</table>