

Table 4.1 Features of sulfur dioxide oxidation in the lower polluted troposphere

Oxidizers	Strong Dependence on Parameters						SO ₂ Oxidation	Linear (24-hr average)	Oxidizer Transported Long-Distance
	Formation			Reaction with SO ₂					
	Sun- light	Temp.	Humidity	Sun- light	Temp.	Mass of Liq. water			
Gas phase									
1. HO	Yes	No	No	No	No	No	= k ₁ [SO ₂][HO] = k ₁ '[SO ₂][sunlight intensity], day = 0, night	No	No
2. HO ₂	Yes	No	No	No	No	No	= k ₂ [SO ₂][HO ₂] = k ₂ '[SO ₂](complex function), day = 0, night	No	No
3. RO ₂	Yes	No	No	No	No	No	= k ₃ [SO ₂][RO ₂] = k ₃ '[SO ₂](complex function), day = 0, night	No	No
Aqueous phase ^a									
4. H ₂ O ₂	Yes	No	No	No	No	Yes	= (LWC) k ₄ [H ₂ O ₂][SO ₂ ·H ₂ O]	No	Yes
5. O ₃	Yes	No	No	No	Yes	Yes	= (LWC) k ₅ [O ₃][SO ₂ ·H ₂ O]/[H ⁺]	No	Yes
6. NO ₂	Yes	No	No	No	Yes	Yes	?	No	Yes
7. HNO ₂	Yes	No	No	No	Yes	Yes	= k ₇ [SO ₂ ·H ₂ O][HNO ₂]/[H ⁺] ²	No	Yes
8. Mn(II)	No	No	No	No	Yes	No	= k ₈ [Mn(II)]	?	Yes
9. Fe(III)	No	No	No	No	Yes	No	= k ₉ [SO ₂ ·H ₂ O][Fe(III)]/[H ⁺]	?	Yes
10. C(O)	No	No	No	No	Yes	No	= k ₁₀ [C(O)]	?	Yes

a. SO_{2(gas)} ↔ SO₂·H₂O (absorption/desorption)
 SO₂·H₂O ↔ H⁺ + HSO₃⁻ (dissociation/association)