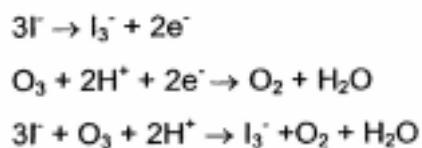
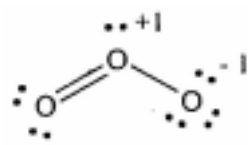


問題 14: 空気中のオゾン濃度の測定

14-1.



14-2.



14-3. 吸光度は次により与えられるので,

$$\begin{aligned}A &= -\log T = -\log(I_{\text{sample}}/I_{\text{blank}}) = \log(R_{\text{sample}}/R_{\text{blank}}) \\ &= \log(19.4 \text{ k}/12.1 \text{ k}) = 0.205\end{aligned}$$

$$[\text{I}_3^-] = AI\epsilon b = 0.205 / (240,000 \text{ M}^{-1}\text{cm}^{-1}) (1.1 \text{ cm}) = 7.76 \times 10^{-7} \text{ M}$$

O₃ の物質質量 (モル数) は $= V_{\text{sample}} [\text{I}_3^-] = (0.01 \text{ L}) (7.76 \times 10^{-7} \text{ mol/L}) = 7.76 \times 10^{-9} \text{ mol}$

14-4. 採取された空気の物質質量 (モル数) は

$$\begin{aligned}&= PV/RT = P(t_{\text{sampling}} F)/RT \\ &= (750 \text{ torr}) (30 \text{ min}) (0.250 \text{ L/min}) / (62.4 \text{ torr} \cdot \text{L mol}^{-1}\text{K}^{-1}) (298\text{K}) = 0.302\end{aligned}$$

mol

$$\text{ppb で表した O}_3 \text{ 濃度} = (7.76 \times 10^{-9} \text{ mol} / 0.302 \text{ mol}) \times 10^9 = 25.7$$