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Purpose:

Use chemical dosing process to test the concentration change of ozone in water and thus tends to find out the dissipation status.

Test instrument: OH-6800

Test temperature:

- Lab ambient temperature: 22°C ~23°C
- Pure water temperature: 24°C ~25°C

Lab operator: Zhao, Wei-Jun



Test apparatus and procedure:

1. Test apparatus:

Electronic Balance, Weight-Measurement Paper & Spoon, Triangle Cone Bottle, Volume-Measurement Cylinder, Suction Tube and Dosing Tube & Rack.

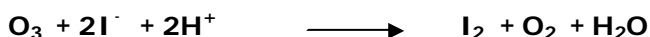
2. Chemicals applied:

H₃BO₃, KI, 0.01N Na₂S₂O₃ and Starch TS (Amylum Indicator).

3. Test procedure

- Take 0.6184g of H₃BO₃ and 1g of KI and solve them into 30mL pure water, then, add 1mL of Starch TS.
- Set the OH-6800 concentration at 150mg/hr, then, introduce O₃ into a triangle cone bottle contained by 70mL pure water for 1 min. and stay for another 0, 5, 10 and 15min.
- When the stay time is due, mix the solution prepared in step a & b; if there is any O₃ contained in the solution, the solution's color would turn to purple.
- Dose 0.01N Na₂S₂O₃ till the purple color disappears; record the volume (ml) of 0.01N Na₂S₂O₃ consumed.
- Follow the formula listed below to calculate the O₃ volume introduced within 1min. period, and the weight (mg) dissolved into pure water after 0, 5, 10 & 15 min (the total solution volume is 100mL).

【Derivation of O₃ concentration】



$$\text{O}_3 = \text{I}_2 = 2\text{I}^- = 2\text{e}^-$$

$$\text{O}_3 \text{ equivalent quantity} \Rightarrow \text{molecule weight}/2 = 48/2 = 24$$

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$$\frac{\text{O}_3(\text{mg})/\text{min}}{\text{O}_3 \text{ equivalent}} = N_1 \times V_1$$

$$\Rightarrow \frac{\text{O}_3(\text{mg})/\text{min}}{24} = 0.01 \times V_1$$

$$\Rightarrow \text{O}_3(\text{mg}) / \text{min} = 0.24 \times V_1$$

Result and discussion:

Stay time	Na ₂ S ₂ O ₃ (mL)	O ₃ (mg) introduced within 1 min	ppm (mg/L) (total solution volume is 100mL)
0 min	1.2	0.288	2.88
5min	0.72	0.1728	1.728
10min	0.24	0.0576	0.576
15min	Solution color isn't changed, which means no further O ₃ left in the solution		

The O₃ dissipating speed is (2.88-1.728)/5 =0.2304 (ppm/min)



From the above test result we can see that by using OH-6800 to generate O₃ (the concentration is set to 150mg/hr), and introduce it into 70ml pure water for 1 min. and stay, the longer the stay time last, the lower the O₃ concentration becomes. And the O₃ dissipating speed is 0.2304ppm/min (calculated by the test result), or we can say that after staying for 15 min, all O₃ are completely dissipated already. A supplementary is added: the O₃ concentration is brought by introducing O₃ for 1 min, the longer time of O₃ introduced, the higher of O₃ concentration would achieve in the pure water.