

DISCRETE ANALYZER CHEMISTRY

Ammonia (NH₃) Method

Methods Referenced

- ISO 15923-1 – “Water quality – Determination of selected parameters by discrete analysis systems – Part 1: Ammonium, nitrate, nitrite, chloride, orthophosphate, sulfate and silicate with photometric detection”
- ISO 7150/1 – “Water quality – Determination of ammonium – Part 1: Manual spectrometric method”

Methods Using a Similar Chemistry:

- EPA Method 350.1 – “Colorimetric, Automated Phenate”
- Standard Methods 4500-NH₃ F – “Phenate Method”

Reagent Composition

Two Reagents are used for the NH₃ method:

Reagent 1, DA-NH3-SALICYLATE, contains the following in DI water:

- 130 g/L Sodium salicylate
- 130 g/L Sodium citrate dihydrate
- 0.972 g/L Sodium nitroferrocyanide dihydrate
AKA Sodium nitroprusside dihydrate

Reagent 2, DA-NH3-DCI, contains the following in DI Water:

- 32 g/L Sodium hydroxide
- 1.72 g/L Sodium dichloroisocyanurate anhydrous

Chemical Reactions

Ammonium reacts with hypochlorite, formed by alkaline hydrolysis of sodium dichloroisocyanurate, and with salicylate at a pH of approximately 12.6 in the presence of sodium nitroprusside as a catalyst to produce a compound with a blue color (Indophenol). Citrate is used to mask interferences by cations such as calcium and magnesium. This method is closely related to the chemistry of Berthelot’s reagent.



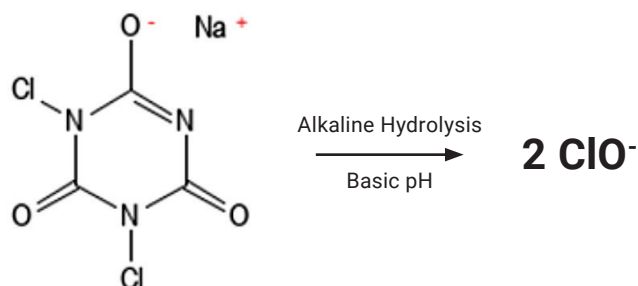
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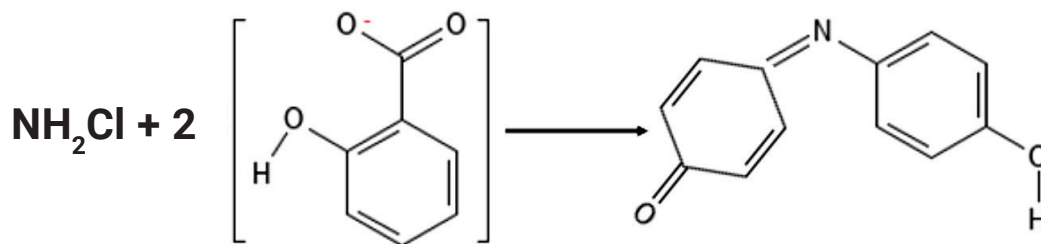
Step 1: Hypochlorite formed by alkaline hydrolysis of dichloroisocyanurate



Step 2: Ammonia reacts with hypochlorite to form chloramine



Step 3: Chloramine reacts with salicylate to form indophenol



Note: Step 3 requires the loss of 2(CO₂) by decarboxylation.