

## 2.7: Common qualitative analysis reagents, their effects, and hazards

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Reagent	Effects	Hazards
6M Ammonia ( $\text{NH}_4\text{OH}$ or $\text{NH}_3$ )	increases $[\text{NH}_3]$ , increases $[\text{OH}^-]$ , decrease $[\text{H}_3\text{O}^+]$ , precipitates insoluble hydroxides, forms $\text{NH}_3$ complexes	Toxic, corrosive, and irritant
6M Hydrochloric acid ( $\text{HCl}$ )	increases $[\text{H}_3\text{O}^+]$ , increases $[\text{Cl}^-]$ , decreases $[\text{OH}^-]$ , dissolves insoluble carbonates, chromates, hydroxides, some sulfates, destroys hydroxo and $\text{NH}_3$ complexes, and precipitates insoluble chlorides	Toxic and corrosive
3% Hydrogen peroxide ( $\text{H}_2\text{O}_2$ )	Oxidizing agent in acidic medium, reducing agent in basic medium	corrosive
6M Nitric acid ( $\text{HNO}_3$ )	Increases $[\text{H}_3\text{O}^+]$ , decreases $[\text{OH}^-]$ , dissolves insoluble carbonates, chromates, and hydroxides, dissolves insoluble sulfides by oxidizing sulfide ion, destroys hydroxo and ammonia complexes, good oxidizing agent when hot	Toxic, corrosive, and strong oxidant
3M Potassium hydroxide ( $\text{KOH}$ )	Increases $[\text{OH}^-]$ , decreases $[\text{H}_3\text{O}^+]$ , forms hydroxo complexes, precipitates insoluble hydroxides	Toxic and corrosive
1M Thioacetamide ( $\text{CH}_3\text{C}(\text{S})\text{NH}_2$ )	Produces $\text{H}_2\text{S}$ , i.e., a source of sulfide ion ( $\text{S}^{2-}$ ), precipitates insoluble sulfides	Toxic and carcinogen

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