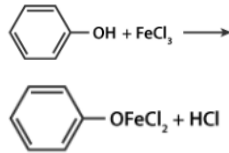
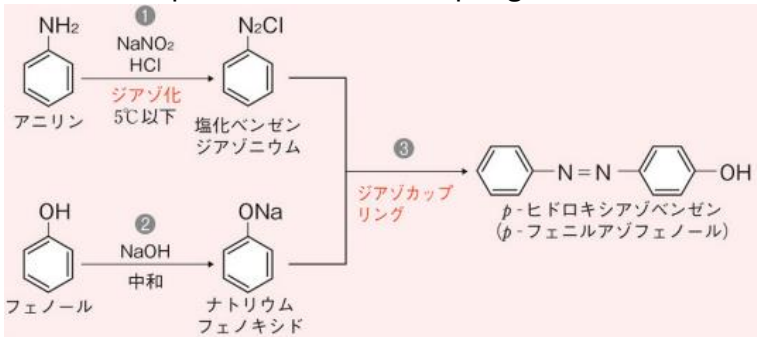


\*Tests based on basic organic reactions are not included.

Function Group	Test	Reagent	Positive result(s)	Equation(s)
Acetylene	Acetylide test	Ammoniacal silver nitrate / Ammoniacal copper nitrate	White precipitate forms / Red precipitate forms	$\begin{array}{l} \text{CH} \\     \\ \text{CH} \end{array} + 2\text{AgNO}_3 + 2\text{NH}_4\text{OH} \longrightarrow \begin{array}{l} \text{C.Ag} \\     \\ \text{C.Ag} \end{array} + 2\text{NH}_4\text{NO}_3 + 2\text{H}_2\text{O}$ $\begin{array}{l} \text{HC} \\     \\ \text{HC} \end{array} + \text{Cu}_2\text{Cl}_2 + 2\text{NH}_4\text{OH} \longrightarrow \begin{array}{l} \text{C}-\text{Cu} \\     \\ \text{C}-\text{Cu} \end{array} + 2\text{NH}_4\text{Cl} + 2\text{H}_2\text{O}$
Alcohol	Ceric ammonium nitrate test	Ceric ammonium nitrate	The solution turns red	$(\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6] + 3\text{ROH} \longrightarrow [\text{Ce}(\text{NO}_3)_4(\text{ROH})_3] + 2\text{NH}_4\text{NO}_3$
2° alcohol	Lucas Test	Lucas Reagent (conc. HCl/ZnCl <sub>2</sub> )	Separates into two layers after a short period	$\text{R}_2\text{CHOH} + \text{HCl} \xrightarrow{\text{ZnCl}_2} \text{R}_2\text{CHCl} + \text{H}_2\text{O}$
3° alcohol	Lucas Test	Lucas Reagent (conc. HCl/ZnCl <sub>2</sub> )	Separates into two layers immediately	$\text{R}_3\text{COH} + \text{HCl} \xrightarrow{\text{ZnCl}_2} \text{R}_3\text{CCl} + \text{H}_2\text{O}$
Aldehyde (reducing sugars)	Tollen's test	Tollen's reagent (Ammonia silver hydroxide)	Silver forms	$\begin{array}{c} \text{O} \\    \\ \text{R}-\text{C}-\text{H} \end{array} \xrightarrow{[\text{Ag}(\text{NH}_3)_2]^+} \begin{array}{c} \text{O} \\    \\ \text{R}-\text{C}-\text{OH} \end{array} + \text{Ag}^0$ <p style="text-align: center;">"Tollens' reagent"</p>
	Fehling's test (except benzaldehyde)	Fehling's reagent (CuSO <sub>4</sub> •5H <sub>2</sub> O)	Red precipitate forms from a blue solution	$\begin{array}{c} \text{O} \\    \\ \text{R}-\text{C}-\text{H} \end{array} + 2\text{Cu}^{2+} + 5\text{OH}^- \xrightarrow{\text{Cupric Hydroxide}} \begin{array}{c} \text{O} \\    \\ \text{R}-\text{C}-\text{O}^- \end{array} + \text{Cu}_2\text{O} + 3\text{H}_2\text{O}$ <p style="text-align: center;">Cuprous oxide      Water</p>
	Benedict's test	Benedict's reagent (Na <sub>2</sub> CO <sub>3</sub> , Sodium citrate, CuSO <sub>4</sub> •5H <sub>2</sub> O)	The blue to yellowish-green solution turns orange to red, depending on the concentration	NA
CH <sub>3</sub> CH(OH)R/ CH <sub>3</sub> COR	Iodoform test	I <sub>2</sub> , NaOH	Yellow iodoform forms	$\begin{array}{c} \text{OH} \\   \\ \text{R}-\text{CHCH}_3 \end{array} \xrightarrow[\text{NaOH}]{\text{I}_2} \begin{array}{c} \text{O} \\    \\ \text{R}-\text{C}-\text{O}^- \end{array} \text{Na}^+ + \text{CHI}_3$

				$\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3 \xrightarrow[\text{NaOH}]{\text{I}_2} \text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}^- \text{Na}^+ + \text{CHI}_3$
Carboxyl	2,4-DNP test	2,4-DNP	Yellow to red precipitate forms	NA
1° Amine	Carbylamine test	Chloroform, alcoholic KOH	Unpleasant smell evolves	$\text{RNH}_2 + \text{CHCl}_3 + 3\text{KOH} \xrightarrow{\text{warm}} \text{R}-\text{NC} + 3\text{KCl} + 3\text{H}_2\text{O}$
Phenol	Ferric chloride test	$\text{FeCl}_3$	The yellow solution turns violet	
Aniline	Hypochlorite	Bleaching powder ( $\text{OCl}^-$ )	Turns reddish purple	NA
	Dichromate test	$\text{CrO}_4^-$	The yellow solution turns greenish-black	NA
	Azo dye test	Refer to the process of diazo coupling: 		
Polysaccharide with a helical structure	Iodine test	$\text{I}_2$	A brown to violet colour evolves, depending on the length	NA
1°/2° amines, amino acids	Ninhydrin test	Ninhydrin reagent	The solution turns violet	NA
Polypeptide with at least 2 peptide bonds	Biuret test	$\text{NaOH}$ , $\text{CuSO}_4$	The mixture turns violet	NA

Amino acids with benzene rings	Xanthoproteic test	Conc. $\text{HNO}_3$ , $\text{NH}_3(\text{aq})$	Turns yellow after heated with conc. $\text{HNO}_3$ and turns orange with $\text{NH}_3(\text{aq})$ added	NA
Amino acids with sulphur	Lead sulfide test	$\text{NaOH}$ , $(\text{CH}_3\text{COO})_2\text{Pb}$	Black $\text{PbS}$ precipitate forms	NA