

Principles Related to Practical Chemistry: one-page cheat sheet

NEET Chemistry · Unit 20 · Practical Chemistry

1 • Extra elements

Sodium fusion turns covalent N, S, X into **ionic** NaCN, Na₂S, NaX.

Element	Observation
N	Prussian blue
S	purple (nitroprusside); black PbS
N + S	blood red [Fe(SCN)] ²⁺
X	AgCl white; AgBr pale yellow; AgI yellow
P	canary yellow with molybdate

CuO + C is the carbon test, not part of Lassaigne's test.

2 • Functional group tests

- C=C, C≡C** Br₂ and Baeyer's reagent decolourised
- Alcohol** Na gives H₂; Lucas: 3° at once, 2° in 5 min, 1° none
- Phenol** neutral FeCl₃ violet; Br₂ water white ppt
- C=O** 2,4-DNP orange for **both** aldehydes and ketones
- Aldehyde** Tollens' mirror; Fehling's (aliphatic only)
- Iodoform** CH₃CO– or CH₃CH(OH)–: yellow CHI₃
- COOH** NaHCO₃ gives CO₂; phenols do not
- 1° amine** carbylamine, azo dye, Hinsberg

3 • Preparations

- Mohr's salt** FeSO₄ + (NH₄)₂SO₄ in **dil. H₂SO₄** (stops Fe²⁺ hydrolysis); pale green, double salt
- Potash alum** Al scrap + KOH, then H₂SO₄; octahedral colourless crystals
- Acetanilide** aniline + (CH₃CO)₂O; **Zn dust** stops oxidation
- Nitration** p-nitroacetanilide: nitrating mixture below 288 K; para major
- Aniline yellow** diazotise (273–278 K), couple with aniline

4 • Titrations

$$n_1 M_1 V_1 = n_2 M_2 V_2$$

- n-factors** KMnO₄ (acid) 5; oxalic acid 2; Mohr's salt 1
- Primary std.** oxalic acid, Na₂CO₃, Mohr's salt; **not** NaOH or KMnO₄

Indicator	Use
phenolphthalein (8.3–10)	strong/strong; weak acid/strong base
methyl orange (3.1–4.4)	strong acid/weak base
none sharp	weak acid/weak base

5 • KMnO₄ titrations

- Oxalic acid** warm to 60–70 °C; dil. H₂SO₄; self-indicator; autocatalysed by Mn²⁺
- Mohr's salt** in the cold; dil. H₂SO₄
- Why H₂SO₄** HCl is oxidised to Cl₂; HNO₃ is itself an oxidant
- End point** first permanent light pink; read the top of the meniscus
- 20 mL of 0.05 M oxalic acid needs 25 mL KMnO₄:
 $2 \times 0.05 \times 20 = 5 \times M \times 25$, so $M = 0.016$ M.

6 • Anion analysis

Ion	Test
CO ₃ ^{2–}	dil. acid: CO ₂ turns lime water milky
S ^{2–}	H ₂ S; lead acetate black; nitroprusside purple
SO ₃ ^{2–}	SO ₂ turns K ₂ Cr ₂ O ₇ green
Cl [–]	HCl fumes; chromyl chloride test (red CrO ₂ Cl ₂)
Br [–] / I [–]	brown Br ₂ / violet I ₂
SO ₄ ^{2–}	BaCl ₂ : white, insoluble in HCl
NO ₃ [–]	brown ring (FeSO ₄ + conc. H ₂ SO ₄)

7 • Cation groups

Group	Cations	Reagent
0	NH ₄ ⁺	NaOH; Nessler's: brown
I	Pb ²⁺	dil. HCl
II	Cu ²⁺ (Pb ²⁺)	H ₂ S, dil. HCl
III	Fe ³⁺ , Al ³⁺	NH ₄ OH, NH ₄ Cl
IV	Zn, Ni, Co, Mn	H ₂ S, NH ₄ OH
V	Ba, Ca, Sr	(NH ₄) ₂ CO ₃
VI	Mg ²⁺	Na ₂ HPO ₄

Confirm Fe³⁺ + KSCN red; Ni²⁺ + DMG red; Cu²⁺ + excess NH₄OH deep blue

Flame Ba apple green; Ca brick red; Sr crimson

8 • Thermochemistry & sols

Calorimeter $q = ms\Delta T$; $\Delta_{sol}H = q/n$

Neutralisation strong acid + strong base: about –57 kJ mol^{–1}

Lyophilic starch, gum, albumin: stable, reversible

Lyophobic Fe(OH)₃ (FeCl₃ into boiling water), As₂S₃

Seen in NEET 2026

BiO(OH) ⇌ BiO⁺ + OH[–], $K = 4 \times 10^{-10}$.

$$x = 2 \times 10^{-5}, \quad \text{pOH} = 4.699, \quad \text{pH} = 9.301$$

Seen in NEET 2024

Cu²⁺ (II), Al³⁺ (III), Co²⁺ (IV), Ba²⁺ (V), Mg²⁺ (VI): increasing group number.

Mohr's salt is made in **dilute H₂SO₄**.

Seen in NEET 2026

NaOH added to oxalic acid with phenolphthalein: **colourless to pink**.

Six traps to remember

- Lassaigne's test converts covalent to ionic form; CuO + C is not part of it.
- 2,4-DNP does not separate aldehydes from ketones.
- Mohr's salt needs dilute H₂SO₄, never HCl or HNO₃.
- n-factors: KMnO₄ 5, oxalic acid 2, Mohr's salt 1.
- Co²⁺ and Ni²⁺ are Group IV, Mg²⁺ is Group VI.
- Weak acid vs weak base has no sharp indicator.