

IDENTIFICATION TABLE OF CATIONS IN NATURAL COLORS

No group reagent	(NH ₄) ₂ CO ₃ group	(NH ₄) ₂ S group				H ₂ S group	HCl group		Analytical groups	
Mg ⁺⁺	Ca ⁺⁺	[Zn(H ₂ O) ₄] ⁺⁺	[Al(H ₂ O) ₆] ⁺⁺⁺	[Fe(H ₂ O) ₆] ⁺⁺⁺	[Fe(H ₂ O) ₆] ⁺⁺⁺	[Cu(H ₂ O) ₄] ⁺⁺	Pb ⁺⁺	Ag ⁺	Cations/ Reagents	
Cupric salts yield blue or green solutions in water. Anhydrous salts are white or yellow. (solutions of ferrous salts are light green).							1 PbCl ₂ ↓	5 AgCl ↓	HCl	
All solutions containing ferric ions are yellowish-red or red-brown; the ferric ion Fe ⁺⁺⁺ or [Fe(H ₂ O) ₆] ⁺⁺⁺ has a violet color; as a result of hydrolysis in aqueous solutions, the brown complex is obtained.: Fe ⁺⁺⁺ + H ₂ O = [Fe(OH)] ⁺⁺ + H ⁺							Cu ₂ I ₂ ↓ + I ₂ Cu ₂ I ₂ ↓ + I ₂	1 PbI ₂ ↓	5 AgI ↓	KI
3 Mg(OH) ₂ ↓	3 CaCO ₃ ↓	2 Zn(OH) ₂ ↓ → NaAlO ₂	2 Al(OH) ₃ ↓ → NaAlO ₂	3 Fe(OH) ₃ ↓	3 Fe(OH) ₂ ↓	3 Cu(OH) ₂	2 Pb(OH) ₂ ↓ → Na ₂ PbO ₂	AgOH → → Ag ₂ O ↓	NaOH	
		4 ZnS ↓	3 Al(OH) ₃ ↓	3 2FeS ↓ + S ↓	3 FeS ↓	5 CuS ↓	5 PbS ↓	5 Ag ₂ S ↓	(NH ₄) ₂ S	
?		2 Zn(OH) ₂ ↓ → [Zn(NH ₃) ₄] ⁺⁺	3 Al(OH) ₃ ↓	3 Fe(OH) ₃ ↓	3 Fe(OH) ₂ ↓	[Cu(NH ₃) ₄]SO ₄	3 Pb(OH) ₂ ↓	2 Ag ₂ O ↓ → [Ag(NH ₃) ₂]OH	NH ₄ OH	
	CaK ₂ [Fe(CN) ₆] In the presence of excess ammonium chloride solution	5 Zn ₃ K ₂ [Fe(CN) ₆] ₂ ↓		5 Fe ₄ [Fe(CN) ₆] ₃ ↓	3 K ₂ Fe[Fe(CN) ₆]	5 Cu ₂ [Fe(CN) ₆] ↓	3 Pb ₂ [Fe(CN) ₆] ↓	5	K ₄ [Fe(CN) ₆]	
	Ca ₃ [Fe(CN) ₆] ₂	5 Zn ₃ [Fe(CN) ₆] ₂ ↓		Fe[Fe(CN) ₆] ↓	Fe ₃ [Fe(CN) ₆] ₂			5 Ag ₃ [Fe(CN) ₆] ↓	K ₃ [Fe(CN) ₆]	
				Fe(CNS) ₃		3 Cu(CNS) ₂ ↓ → CuCNS ↓		3 AgCNS	KCNS	
2 MgCO ₃ · Mg(OH) ₂	3 CaCO ₃ ↓	2 ZnCO ₃ · Zn(OH) ₂ ↓	3 Al(OH) ₃ ↓	3 Fe(OH) ₃	3 FeCO ₃ ↓		3 PbCO ₃ · Pb(OH) ₂	2 Ag ₂ CO ₃ ↓	(NH ₄) ₂ CO ₃	
3 MgHPO ₄ ↓	3 CaHPO ₄ ↓	2 Zn ₃ (PO ₄) ₂ ↓	4 AlPO ₄ ↓	4 FePO ₄	3 Fe ₃ (PO ₄) ₂ ↓	3 Cu ₃ (PO ₄) ₂	4 Pb ₃ (PO ₄) ₂	3 Ag ₃ PO ₄ ↓	Na ₂ HPO ₄	
4 CaC ₂ O ₄ ↓	All oxalates except divalent (ferrous) iron oxalate are insoluble in water but soluble in acids. 1. The precipitate is soluble in hot water 2. The precipitate is soluble in an excess of reagent. 3. The precipitate is soluble in dilute mineral acids and in acetic acid. 4. The precipitate is soluble in dilute mineral acids but insoluble in acetic acid. 5. The precipitate is insoluble in dilute mineral acids.							© Copyright 1994 Freund Publishing House, Tel Aviv/London	(NH ₄) ₂ C ₂ O ₄	