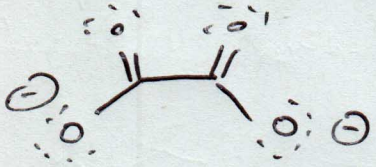
Ligands - usually small molecules that can attach at one or more points to a transition metal with different degrees of reversibility.

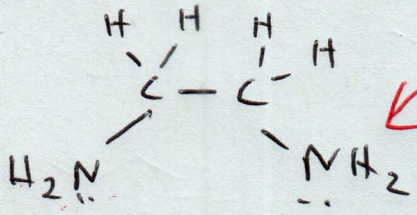
neutral		anionic (-0)	
aqua	H_2O	fluoro	F^-
ammine	NH_3	chloro	Cl^-
Carbonyl	CO	bromo	Br^-
Nitrosyl	NO	iodo	I^-
		hydroxo	OH^-
		Cyano	CN^-

monodentate - "one-toothed" - connects only once to the transition metal center

bidentate - "two-toothed"



oxalate

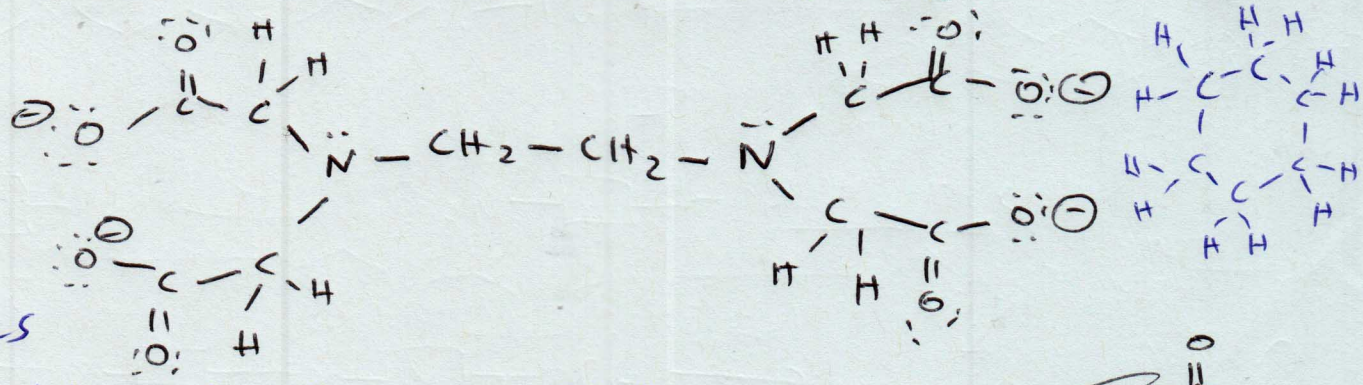


ethylenediamine (en)

amine - an organic molecule with $-NH_2$ group.

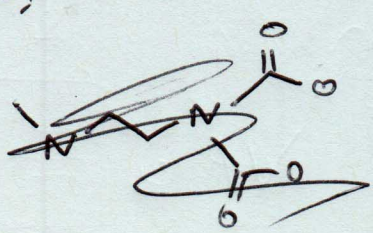
polydentate - "many-toothed" - attaches at multiple points to a transition metal

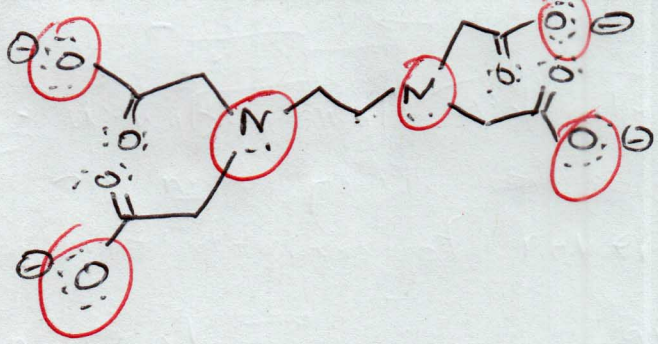
EDTA - ethylenediaminetetraacetate



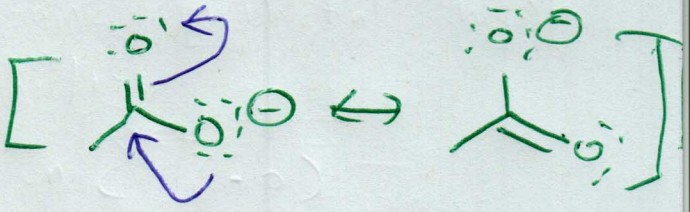
Line structures

- atom labels for C are omitted, as well as H attached to C
- carbon is assumed to be tetravalent unless otherwise indicated ("missing" atoms are H)





6 attachment points



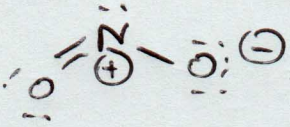
— Nomenclature (naming complexes)

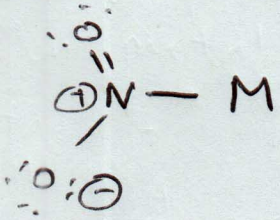
$[Co(NH_3)_4Cl_2]Cl$ (+3, +1)

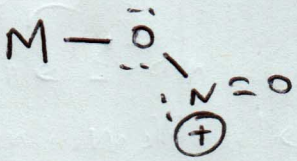
tetraammine dichloro cobalt (III) chloride

Isomers — compounds with identical formulas but different structures

NO_2^-







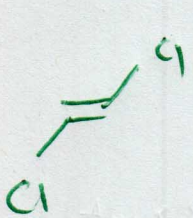
Structural isomers — compounds with identical ~~formula~~ formula but different bond connectivity

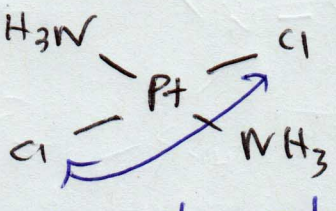
nitro

nitrito

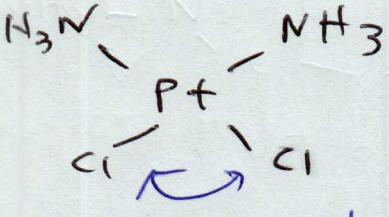
diastereomers — compounds with identical formulas and bond connectivity, but different 3D spacial arrangement of atoms.

$[Pt(NH_3)_2Cl_2]$

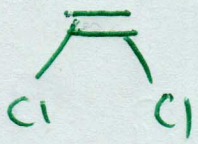




opposite sides → trans



same side → cis



enantiomers— similar to diastereomers, except that enantiomers are non-superimposable mirror images (left + right handed)