MAGMATIC DEPOSITS IN REFERENCE TO INDIA

WHAT ARE MAGMATIC DEPOSITS?

- MAGMATIC DEPOSITS ARE ACCUMULATIONS OF MAGMATIC MINERALS.
- THEY ARE CHARACTERISED BY THEIR CLOSE RELATIONSHIPS WITH INTERMEDIATE OR DEEP SEATED INTRUSIVE IGNEOUS ROCKS.
- THEY CONSTITUTE EITHER THE WHOLE IGNEOUS MASS OR A PART OF IT OR MAY FORM OFFSET BODIES.
- THEY ARE MAGMATIC PRODUCTS THAT CRYSTALLISE FROM MAGMA.
- THEY ARE ALSO NAMED AS MAGMATIC SEGREGATION, MAGMATIC INJECTION, IGNEOUS SYNGENETIC DEPOSITS.

FORMATION OF MAGMATIC DEPOSITS

- SIMPLE CRYSTALLIZATION
- CONCENTRATION BY DIFFERENTIATION OF INTRUSIVE IGNEOUS ROCKS

CLASSIFICATION OF MAGMATIC DEPOSITS

EARLY MAGMATIC DEPOSITS

- Ore minerals crystallizes earlier than that of rock silicates
- Also known as orthotectic & orthomagnetic
- Forms simultaneously with the host rocks
- Result of :
  - Simple crystallization without concentration
  - Segregation of early formed crystals
  - Injection of material concentrated elsewhere by differentiation

LATE MAGMATIC DEPOSITS

- Ore minerals crystallizes later than that of rock silicates
- Formed towards the close of magmatic period
- Always associated with mafic igneous rocks
- Result of:
  - Variation of crystallization differentiation
  - Gravitative accumulation of heavy residual liquids
  - Liquid separation of sulphide deposits

EARLY MAGMATIC DEPOSITS

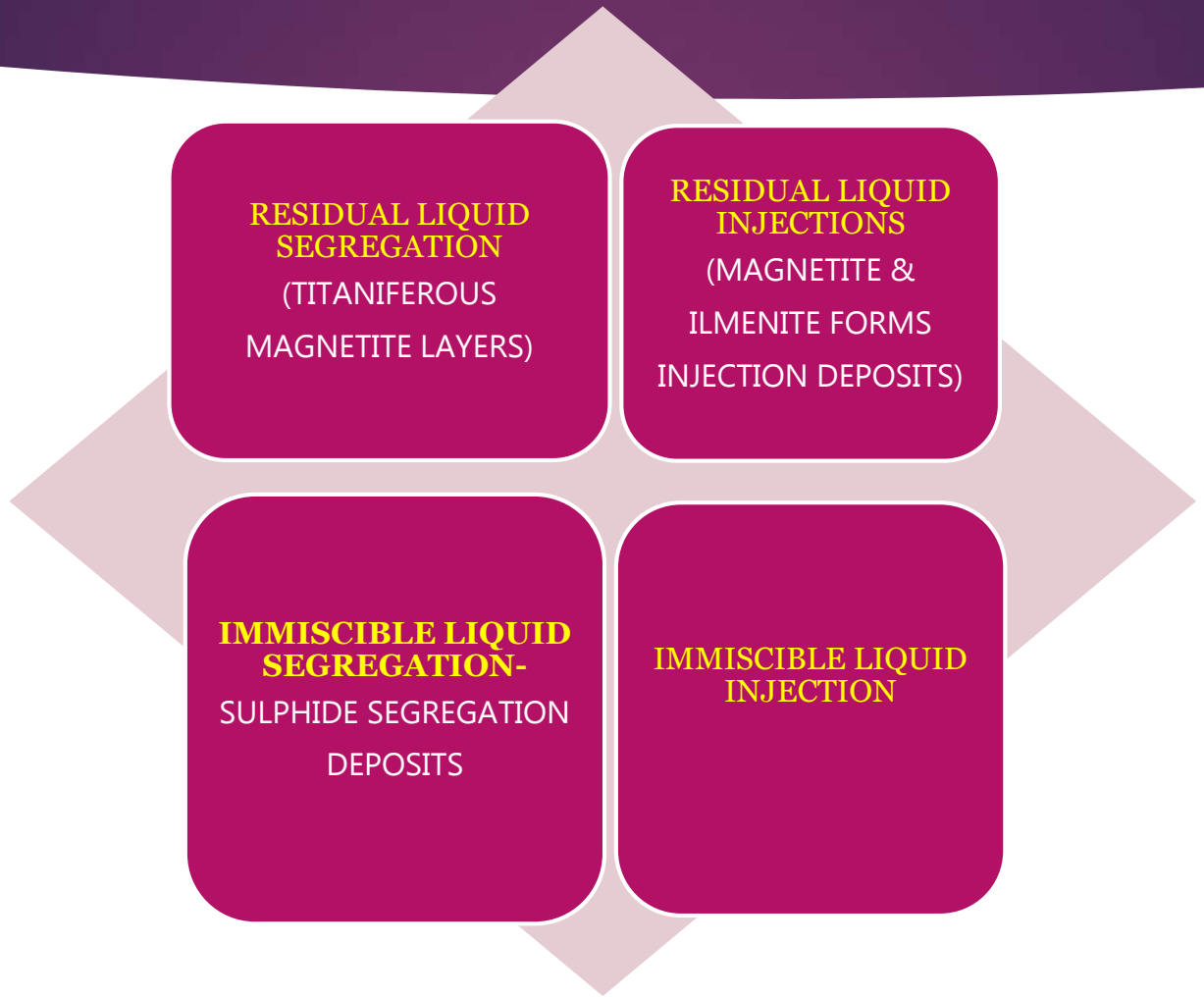
DISSEMINATION

- Crystallization without concentrating the whole rock mass, deposits occurs as phenocrysts
- Large body; dyke, pipe shaped
- Diamond pipes of south Africa
- Corundum in nepheline-syenite
- Disseminated deposits of diamond pipe of Panna, MP.

SEGREGATION

- Early formed heavy crystals sinks to the lower part of the chamber and segregate in bodies of sufficient size
- Deposits are lenticular, pod shaped lenses, stringers , bunches and are smaller in size.
- Layered anorthosite segregated deposits in sittampundi complex, Salem, Tamil nadu
- Partly layered anorthosite in saltora in Bankura, west Bengal.

LATE MAGMATIC DEPOSITS



PEGMATITE DEPOSITS:

- ✓ **Formed at the later stage of crystallization, that continues up to great depths, where water rich magma migrates and forms small bodies of igneous rock that are enriched in rare elements like Li, Be, etc. such small igneous bodies are called Rare metal Pegmatites.**
- ✓ **They are important source of Li, Be, Gemstones.**
- ✓ **They are source of syngenetic radioactive minerals formed by alkali- rich magma.**
- ✓ **Shaped of the bodies are tabular & lenticular.**

OCCURENCES:

- Bisundi Mine, Rajasthan uraninite occurs in pockets with cleavelanite feldspar.
- The Suryamalai Granitic Batholith, Salem district
- Radioactive patches around Gadwal, Mehboobnagar, Andhra Pradesh
- The Syenite outcrops near Samalapti and Kumandapati, Salem District.

CARBONATITE DEPOSITS :

- Formed as magmatic segregation deposits.
- It consists of carbonate minerals like dolomite & calcite.
- Deposits are related to the alkali rock forming processes and alkali magma extrusions.
- Deposits contains, fluorocarbons, rare earth ore minerals. The niobium ore minerals and copper sulphide ore minerals.
- occurs close to alkaline-ultra mafic intrusions like kimberlites & lamproites.
- Occurrences:
  - **ambadungar , Gujarat.**
  - **Newania, Rajasthan.**

Ni-Cu/ Co DEPOSITS:

- formed at the end of magmatic deposits, due to liquid immiscibility
- Occurs in the embayment at or near the base of their intrusive hosts.
- Found in the layered intrusions , stocks and ultramafic sills and flows.
- Ores can be massive , net textured and disseminated.
- Structural settings involved are: Archean green stone belt, rifted continental basins and intracontinental areas.

CHROMITE DEPOSITS :

- **Formed as the end products of the separation of solid phases from a liquid and their accumulation in chromite rich layers.**
- **Formation of chromite rich layers takes place by fractional crystallization and gravitational settings,**
- **Formed as cumulate layers at the base.**
- **two types of chromite deposits :**

  stratiform chromite deposits

  podiform chromite deposits.

STRATIFORM VS PODIFORM Cr DEPOSITS:

CATEGORIES	STRATIFORM	PODIFORM
BELONGS TO →	Intruded into stable cratons with sedimentary & igneous features.	Mobile belts, orogenic zones with ophiolites in marginal zones.
FORM →	Sheet like, great lateral extent, uniform & consistent.	Irregular & unpredictable , pod like small lenses.
COMPOSITION →	Ultrabasic differentiation of gabbroid magma.	Peridotite masses / gabbro.
ASSOCIATED DEPOSITS →	PGE deposits in UPPER, vandiferous magnetite at TOP.	******
CRYSTALLISED →	Upper crust	Mantle
	SITTAMPUNDI COMPLEX, SALEM, TAMIL NADU.	

THANK YOU..