

Practical Sedimentary petrography



Carbonate petrography

Lab. No. 2

Carbonate petrography

- Carbonate rocks make up about one-quarter of all sedimentary rocks in the stratigraphic record.
- A carbonate rock consists of 50 percent or more carbonate minerals, which are most commonly calcite and dolomite. Same as that of sandstones, carbonate rocks are obviously an important group of rocks.

Carbonate petrography

- The study of limestones ,dolomites and associated deposits under optical or electron microscops. The type of the lightning is :
- PPL- plane polarized light
- XPl-cross-polarized light

The basic components of carbonate rocks are: { **Ground mass (Micrite , Sparite) and Allochems (grains) }**

1-Ground mass

Groundmass is broadly defined as micrite and sparite . Micrite is usually settled in calm, low energy environment . Sparite is precipitated in agitated (High energy) conditions

a-Micrite (Matrix):is microcrystalline calcite, its grain size is less than 4 μm . In general, Micrite is a very fine grained matrix and it's a synonym for carbonate Mud, translucent and almost opaque in thin section .

b-Sparite (Cement): forms of crystals generally over 10 μm in diameter, differs from micrite by its clear and coarser crystals. It occurred as a chemical deposition of calcium carbonate inside the grains and pore cracks.

2-Allochems (Grains): They are two types

a-**skeletal grains:** Are preserved hard parts of fossil assemblages with their fragmented particles (bioclasts). Their distribution is controlled by water depth, bottom currents, climate, basin physiography, and nutrient supply. Including **Fossils and Bioclasts.**

Fossils are :Completed or fragmented fossil grains like: Foraminifers , Calcareous algae , Corals , Bryozoans, Brachiopods, Gastropods Bivalves (Pelecypods), Anthropods, conodonts and plant remains (Spores and pollens).

Fragmented fossil grains are called **Bioclasts**, distracted by action of waves and currents in the depositional basin. Bioclasts give clues to water energy depending on its shape whether flattened or rounded.

b- **Non Skeletal grains** distributed in distinctive depositional environments as a dominant grains. The most important non skeletal grains are:’

Peloids , pellets , OOids, Intraclasts , Extra clasts , Grapestone and non carbonate grains (Terrigenous material).

Pellets: Small spherical , ovoid or rod shaped grains composed of carbonate mud (Micrite). Lack internal structure.

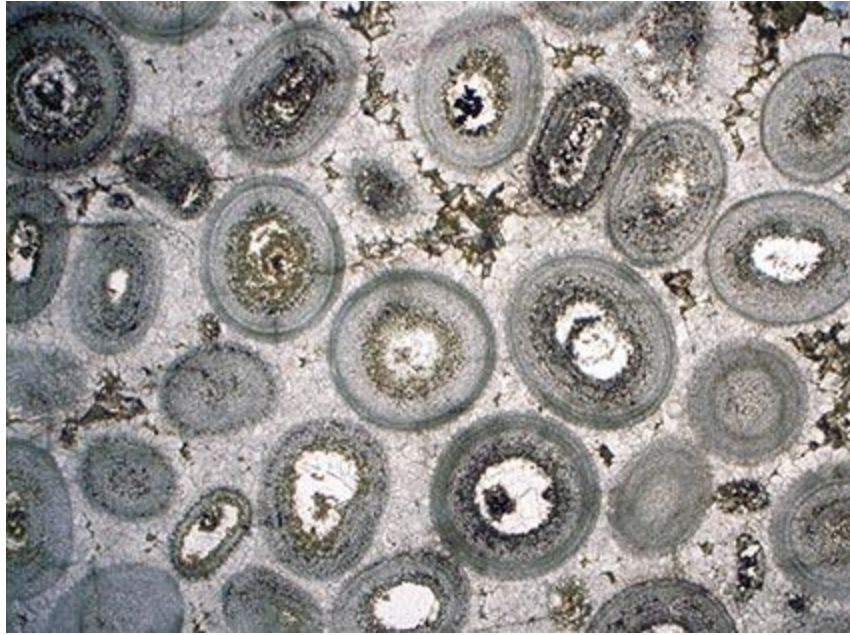
Peloids: grains composed of micritic material without any mode of origin. It may be microbial, inorganic precipitates, indistinct intraclasts, micritized ooids or covered pellets.

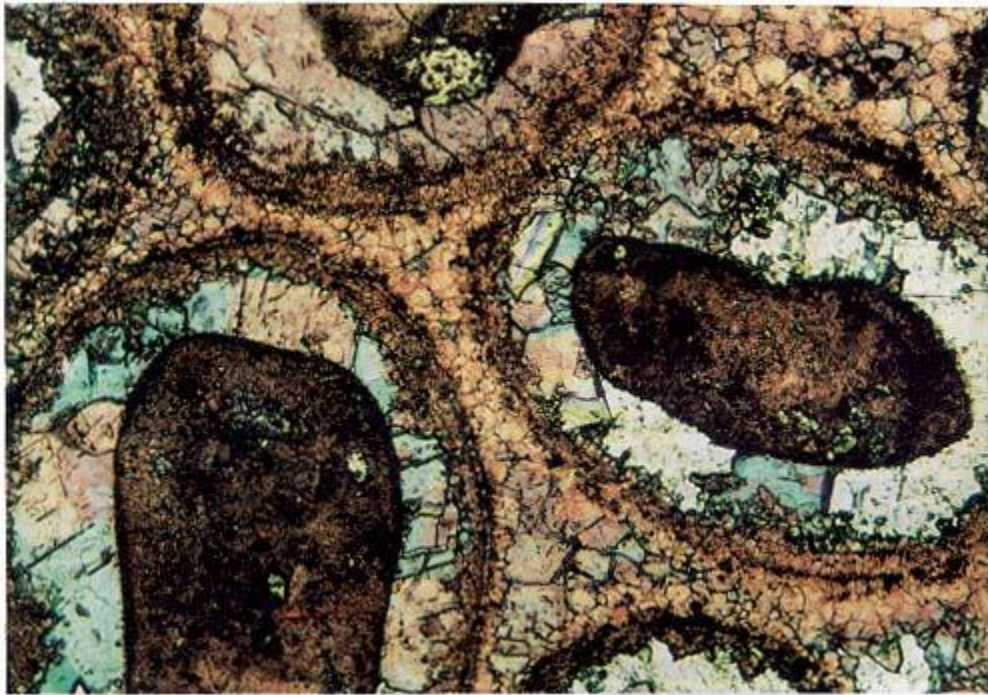
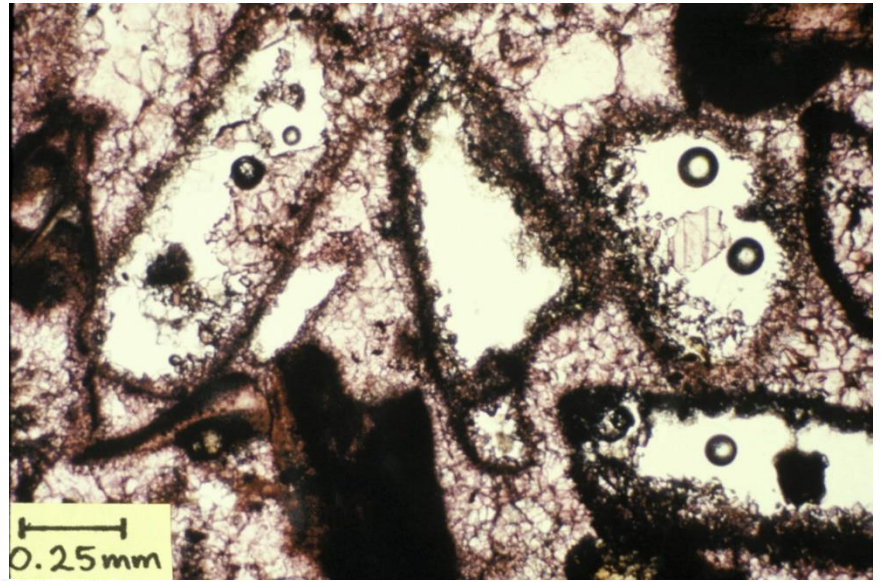
Ooids:- Spherical ellipsoidal grains, with a nucleus covered by one or more concentric or radial internal structure. 0.25 – 2mm in diameter.

Superficial ooid: An ooid with an incomplete or very thin coating .

Intraclast: A fragment of weakly consolidated carbonate sediment that been eroded and redeposited within the same depositional basin.

Extraclast: A detrital grain of lithified sediment derived from outside the basin of deposition .





B

1/2 mm