

Nummulite chalk (dolomitic limestone)

Sample: TU8

Type of rock: Sedimentary

Age: Eocene

Location/Formation: Ribecourt, France

Characteristic summary:

Main components:

Grain size (Max):

Grain morphology

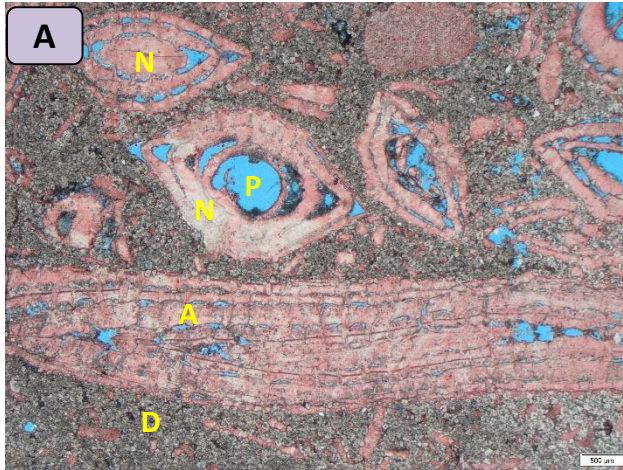
Fabric:

Nummulitidae fossils in a dolomitic matrix

Pebble

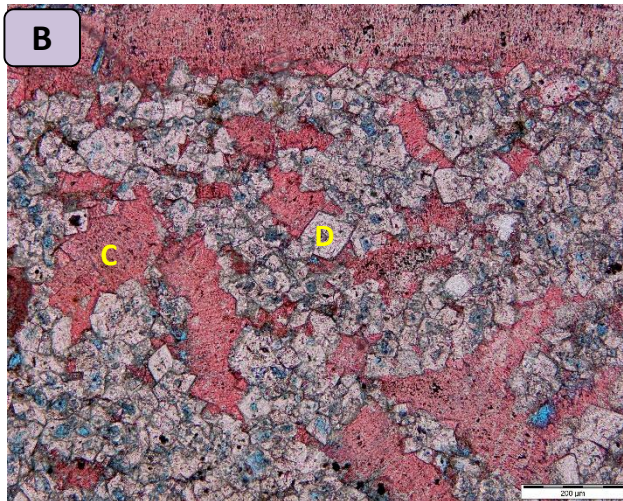
Skeletal grains in euhedral dolomite matrix

Floatstone



PPL image

Magnification: 11x



PPL image

Magnification: 113x

Noteworthy features

Components: The sample is mainly composed of large (few millimeters) and very large (few centimeters) fossils belonging to the family of Nummulitidae, a group of marine unicellular organisms typical of tropical shallow waters, 'floating' between fine (tens of microns) dolomite crystals (matrix, floatstone texture). The thin section is stained with alizarine red. Note (Image B) that the well-shaped (euhedral) dolomite rhombs (D) in the detail view show their original color, while fossil fragments made of calcite (C) are stained pink. The sample shows two types of Nummulitidae: the larger, elongated *Assilina* (A) and the smaller, rugby-ball shaped *Nummulites* (N). Those are index fossils of the Paleogene, the presence of *Assilina*, in particular, allow to constrain the age of the sample to the Eocene.

Processes reconstructed from the thin section: The sample shows a case of ongoing selective dolomitization, a process by which dolomite, a calcium magnesium carbonate, replaces calcite, a calcium carbonate. While the large fossils are preserved and show large internal pores (P), the matrix, previously composed of calcareous mud, is almost completely substituted by dolomite crystals. This sample and the dolostone of sample TU6, show two ideal snapshots of the dolomitization process.

This sample: The dolomite completely substituted the rock matrix, leaving the more stable large fossils undisturbed.

Sample TU6: The dolomite has completely substituted the original carbonate and additionally the dolomite crystals grew further from the originally well-shaped loosely packed rhombs into a tight mosaic of coarse unshaped crystals. This is not unlike in a slowly cooling magma, even if here the minerals precipitated from a solution (water) but not from molten rock. The large fossils were dissolved forming large vugs, only partly filled by new dolomite crystals.

Occurrence: France, Southern England, Alps (Italy), North Africa, Turkey, Middle East.

Technical use: Building stone, used by ancient Egyptians to build their pyramids.