ALVEOLIZATION

Sample

Roman Wall of Tarragona. Spain. Portal de Sant Antoni.

Pathology Causes

Limestone of the Miocene age from Tarragona quarries. This partially dolomitized calcisiltite rock presents an idiotypic zoned fabric, with anomalous intracrystalline distribution, deficient in magnesium by geological processes. These crystals undergo a differential dissolution of their nuclei, which produces abundant intracrystalline moldic porosity and subsequent disaggregation favoring the formation of sand.

This predisposition to alteration of diagenetic origin, is speeded by existing gypsum and other sulphates eflorescences, external to the rock.

Visual Image

Author: J.L.Prada

Description: Altered ashlars from the Portal. The disaggregation processes and the formation of sand have

been produced by differential dissolution the anomalous dolomite crystalline.

Image detail / macro

Author: Africa Pitarch
Magnification: x100. MOP -thin section- crossed polar (XPL).
Description: These processes are very difficult to observe with stereomicroscope, because the dolomite crystals are smaller than a millimeter (micrometer scale)

Microscope Image

Author: Figure 1.Africa Pitarch. Figure 2. J.L.Prada
Magnification: Figure1. x120. Figure 2. x1570

Description: Figure 1. MOP -thin section- crossed polar (XPL). Dolomitic limestone with distinctly zoned crystal. The nuclei of euhedral rhomb-shaped crystal is unstained because it is not dedolomitized. The external zone is red stained because it is dedolomitized. These anomalous minerals undergo a differential dissolution and produce the subsequent disaggregation of material.

Figure 2. SEM-BSEI electron image. Differential dissolution of the nuclei produces abundant intracrystalline moldic porosity.

Associated Pathologies

Flaking,

Sanding.

Soluble salts.

Other Tests

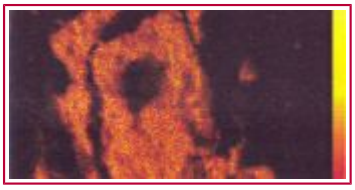

Figure1. X Ray image. Mg - EPMB CamecaX50-1500X

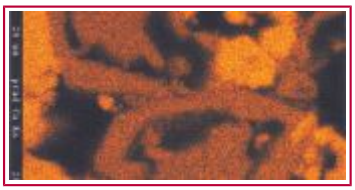

Figure 2. X Ray image. Ca - EPMB CamecaX50-1570X

Observations

Figure 1. Anomalous intracrystalline magnesium distribution. The anomalous dolomite due to a deficiency in magnesium is frequently found in the nuclei of the dolomite crystal.

Figure 2. Differential dissolution of the nuclei of dolomite crystal.

These mechanisms may be detemined using the new techniques of electron microscopy -Electron Probe Micro Analyzer (EPMA)- that allow crystallochemycal studies. The figures show the anomalous intracrystalline distribution of calcium and magnesium. In conclusion, this mineral is non-stechiometric and deficient in magnesium. This composition is a favourable factor of stone decay process.

Bibliography

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Published Articles

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