EUHEDRAL, JURASSIC DIAGENETIC OPAL-CT FROM ÚRKÚT, BAKONY MTS., HUNGARY

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During the systematic mineralogical characterisation of the Toarcian–Dogger pelagic sedimentary "Eplény Limestone" Formation in Úrkút, Bakony Mts., Hungary, we found an alternation of softer, more clayey and harder, strongly silicified strata. We showed that this silicification was related to early diagenetic processes (PEKKER & WEISZBURG, 2006).

SiO_2 phases were identified, mainly by using separated and specially prepared (polished; broken, etched etc.) samples, by X-ray powder diffraction (XRD), by local Fourier transform infrared spectroscopy (FTIR) and by scanning electron microscopy (SEM + EDX).

Beside various forms of quartz **opal-CT "polycrystals"** were identified, forming two groups on the basis of aggregate morphology: "**spheres"** made up of micrometre-sized euhedral blades and **"pore wall coatings"** made up of similar blades, covering apparently the original pore walls of the not fully consolidated sediment.

The **spheres** made up of blades have a uniform diameter of 7–10 μm and are widespread in the original pore space. These spheres resemble both in size and morphology euhedral opal-CT crystal aggregates, described as *lepispheres* by FLÖRKE *et al.* (1975). The only, but significant, difference is that the spheres in our samples have a pronounced concentric inner structure: most cases they are built up of a core of 1–3 μm and a distinct outer shell of varying thickness. The gap between the outer surface of the core and the inner surface of the outer shell may reach up to 1–2 μm (Fig. 1). Spheres often coalesce so that within one common outer shell two or more discrete cores are present. That concentric inner structure indicates that opal-CT crystallised directly as perimorphose on the surface (outer shell) and on the inner wall (core) of spherical cavernous structures present during the early diagenesis. That observation and the strikingly uniform size distribution of the spheres suggest that the crystallisation surface was provided by living organisms like bacteria that are abundant in a wide variety of environmental conditions, including deep sea environments. Fossilised (calcified) bacteria of similar aggregate morphology were reported from a different environment (BEHR & RÖHRICHT, 2000; cyanobacteria, *e.g. Pleurocapsa*, *Gloeocapsa*). FORTIN *et al.* (1997) described silica "crust" precipitating on bacterial surfaces, too. The presence of the second aggregate morphology, the **opal-CT coating,** found on the original pore walls (Fig. 2.) support the hypothesis of a syndiagenetic opal-CT crystallisation on the surface of contemporary (Jurassic) organisms, namely bacteria, based on their size and shape.

References

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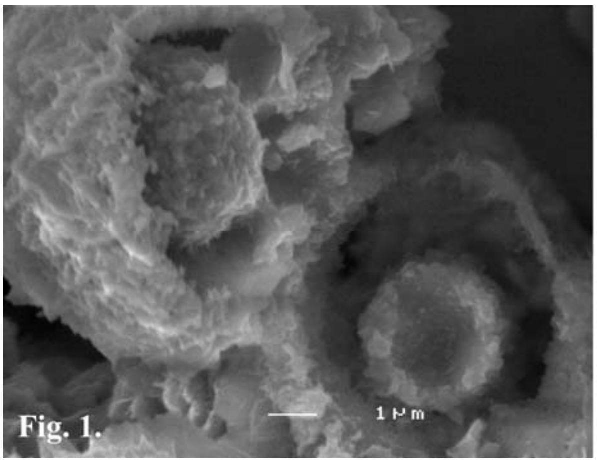

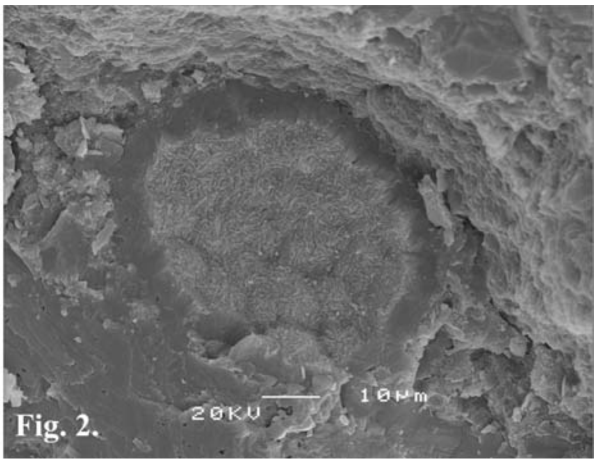

Fig. 1: Concentric spheres of blade-shaped euhedral opal-CT crystallites – perimorphs after bacteria.
Fig. 2: Coating of blade-shaped euhedral opal-CT crystallites – pore wall coating.