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Biogeosciences Discussions

Interactive comment on "Confocal Raman microscopy as a tool to describe different mineral and organic phases at high spatial resolution within marine biogenic carbonates: case study on *Nerita undata* (Gastropoda, Neritopsina)" *by* G. Nehrke and J. Nouet

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Y. D.: - This paper (Confocal Raman microscopy as a tool to describe different mineral and organic phases at high spatial resolution within marine biogenic carbonates: case study on Nerita undata (Gastropoda, Neritopsina) is mainly dedicated to the ability of Raman spectroscopy to analyse of biominerals. The authors have detected some "polyenes" in the shell. Similar components have been already described in mollusc

shells: Hedegaard et al. 2006, Trinkler et al. 2011. Beta carotene is a polyene compound, and it is well known that Raman is very sensitive to carotene. Do the authors believe that such components are preserved in fossil shells, and are possible palaeoproxies?

Answer: - We do not know if polyenes are preserved in fossil shells. But polyenes are, by definition, water insoluble, so we can assume that they would be much better preserved than water soluble molecules like e.g. sugars or proteins, when exposed to fluid.

Polyenes also cover a wide range of compositions within biogenic calcium carbonates – see Hedegaard et al., (2006. Molluscan shell pigments: An in situ Reonance Raman study. Journal of Molluscan Studies 72, 157 - 162). This diversity of structures and compositions should induce very different degradation behaviors when exposed to similar conditions: comparison of polyenic assemblages between fossil and actual specimen (same species) should highlight the diagenetic history of the fossil. Polyene would therefore constitute interesting tracers of taphonomic/diagenetic processes.

Such a study is possible using CRM to trace out the minute position of, for example, C-C and C=C stretching frequency.