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Biogeosciences Discussions

Interactive comment on "Identification of two organic bands showing different chemical composition within the skeleton of *Porites lutea*: a confocal Raman microscopy study" *by* M. Wall and G. Nehrke

Anonymous Referee #2

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Manuscript by Wall and Nehrke describes very interesting insights into the distribution of organic matrix within the skeleton of the coral Porites lutea. After an extensive introduction to the topic, the potential of state-of-the-art confocal Raman microspectroscopy (CRM), in combination with scanning electron microscopy, was exploited to accurately image and characterize organic matrix in concomitance with biomineral. The findings are of a substantial interest to other researchers in the field and are extremely important from the technical point of view. Chemical imaging at submicron resolution provided by CRM can certainly improve our understanding of biomineralization mechanisms. Main

outcomes claimed by authors are: 1. two different types of organic-rich growth lines. One of these corresponds to the well-known incremental growth line, whereas the second is organic-rich and Mg-poor growth line. 2. CRM mapping can be used to visualize the differences in crystal orientation, without the necessity of any sample preparation; the layered distribution of organic matrices could be shown and simultaneously related to the orientation of fibers; CRM mapping can provide information on skeletal growth patterns 3. interesting mechanistic insights are also presented and 4. chemical characterization of organic compounds within coral skeleton can be achieved by Raman spectroscopy .

The manuscript is well written and conclusions are adequately supported by data. The scientific approach and methods applied are valid. I have only few issues, mainly related to the discussion of results presented, that should be addressed by authors before publishing in BGD. The major points are listed below: 1. Page 8285, line 9: Authors should add a plausible suggestion for the function of the low Mg ORGL2 identified in the work. 2. Page 8287, line 14: Considering the title of the paper itself, authors should discuss more in depth spectral features reported in Fig. 11. Several characteristic peaks of organic compounds can be found and, in my opinion, should be assigned and discussed. A table with corresponding assignments would facilitate the interpretation of the fig. 11.

Some minor points are: 1. Page 8279, line 28: Why authors decided to use polarizer at 0 and analyzer at 90 degrees? 2. Page 8282, line 1: The SEM maps in this study show different concentration of Mg throughout analyzed samples. Considering the broadening and shift of v1 CO3 band induced by Mg2+ when incorporated into calcitic minerals (Bischoff et al. 1985), it could be that different concentration of Mg in the aragonite crystals lead to differences in the relative peak intensity of the v1 carbonate band used for orientation measurements. Can authors comment on this? 3. Page 8306, Figure 11. Caption Change: Analysator = Analyzer

Interactive comment on Biogeosciences Discuss., 9, 8273, 2012.