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Interactive comment on "Role of extracellular polymeric substances (EPS) from *Pseudomonas putida* strain MnB1 in dissolution of natural rhodochrosite" *by* H. Wang and X. Pan

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By anonymous Referee #2: "Wang & Pan submitted a manuscript describing results from an experimental study on the role of EPS on the oxidative dissolution of natural rhodochrosite ((MnX)CO3). The presented topic is of clear fundamental international interest and fits into the scope of BG. However, as outlined below, in its concept and present shape it is not suitable for publication. First of all, the presented study contains numerous linguistic and grammatial errors that make a detailed evaluation of the short ms not easy. The referencing is clearly not complete and up to date. In particular, the experimental results show that EPS is impacting the oxidative dissolution of natural

rhodochrosite, which is interesting. However, having sayd this, it remains questionalbe, why natural rhodochrosite and not pure MnCO3 was for used for the study! Based on the very limited chemical analysis of the initial and final solid as well as the aqueous solution, more then 50% of the used solid seems to be actually SiO2. The powder XRD makes clear that the carbonate fraction is not homogeneous in its chemical composition but likely contains foreign ions as Ca, Mg and Fe. These components significantly impacts the dissolution kinetics of MnXCO3 solid-solutions (e.g., Boettcher & Dietzel, EMU notes 2010). The Impact of foreign ions on the reactions at the solid-water interface may be enormous. This is not considered in this study at all and since a complete chemical analysis of the solid is lacking, can also not be evaluated for comparative later use. " Reply: We appreciate the reviewer's constructive comments and made substantial revisions based on the referees' comments. First of all, the general spelling and grammar was corrected by an English editing service. Some relevant references were supplemented (Böttcher and Dietzel, 2010; Prieto et al., 2013; Putnis and Ruiz-Agudo, 2013). Moreover, in the revised manuscript, Powder XRD and SEM-EDS for natural and synthetic rhodochrosite were obtained to explain mineral information. XRD results showed that the raw mineral mainly contains rhodochrosite (83.4%) and some quartz (16.6%). SEM-EDS results show that the content of elemental Si was 12.91% (wt). These results indicated that the content of quartz in natural rhodochrosite was not as high as the reviewer's guess (>50%). Moreover, the effect of foreign ions on the reactions of natural rhodochrosite was considered in the revised manuscript. We have investigated the differences of bacterial oxidative dissolution of natural and synthetic rhodochrosite. We have found that the oxidative dissolution kinetics of natural rhodochrosite was slower than that of synthetic rhodochrosite. The results might be mainly attributed to the differences of crystal structure or the incorporation of foreign ions such as Al, Mg and Si. Supplemental references: (1) Böttcher, M. E., and Dietzel, M.: Metal-ion partitioning during low-temperature precipitation and dissolution of anhydrous carbonates and sulphates ion partitioning in ambient-temperature aqueous systems. EMU Notes in Mineralogy, 10. Mineralogical Society, Twickenham, UK, pp.

139-187, doi: 10.1180/EMU-notes.10.4, 2010. (2) Prieto, M., Astilleros, J. M., and Fernandez-Diaz, L.: Environmental Remediation by Crystallization of Solid Solutions, Elements, 9, 195-201, doi: 10.2113/gselements.9.3.195, 2013. (3) Putnis, C. V., and Ruiz-Agudo, E.: The Mineral-Water Interface: Where Minerals React with the Environment, Elements, 9, 177-182, doi: 10.2113/gselements.9.3.177, 2013.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/11/C5337/2014/bgd-11-C5337-2014-supplement.zip

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Interactive comment on Biogeosciences Discuss., 11, 7273, 2014.