

Magn. Reson. Discuss., referee comment RC1
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Comment on mr-2021-18

Anonymous Referee #1

Referee comment on "An electrochemical cell for in operando ^{13}C nuclear magnetic resonance investigations of carbon dioxide/carbonate processes in aqueous solution" by Sven Jovanovic et al., Magn. Reson. Discuss., <https://doi.org/10.5194/mr-2021-18-RC1>, 2021

This is clearly a very challenging subject, to quantitatively characterize the evolution of ^{13}C NMR signals in the presence of conductive metals, electrochemical processes and various sources of noise and artifacts.

I believe, there are many unknowns left in this study, and questions raised by the authors in the manuscript need to be addressed and verified by them in a systematic manner., e.g., the relaxation measurement inconsistencies, unexpected CO_2 signal decay during OCV and effects of bubbles on homogeneity and susceptibility.

If authors promote this cell design as an advantageous one, there should be a clear evidence of that in terms of quantitative data. I suggest a major revision, which should include troubleshooting addressing the questions raised by the authors, may be with the use of simplified cell design.

Assessment criteria during the full review:

The English needs to be improved quite a bit. A number of errors were noted and paper requires extensive proofreading... e.g. "Lorentzian line shape" – line 365;

What is ppb (line 368), did authors mean "ppm" or "part per billion" ? It is hard to see that from the spectra.

The units of concentration are M, or mM... (mmol/L would be mM, line 387);

Line 381: to use "was observed".

Line 13: "dynamics of the bicarbonate electrolyte changes"

Line 35: "chemical and reaction analysis" ... not clear wording... is it "chemical reaction analysis" ?

Line40: "Several experiment setups ... were published"

Line 80: references should appear in chronological or alphabetic order.

Line91 to use: "A three-electrode electrolysis cell that fits a standard 5 mm NMR tube has been build."

Define "iR" in the text.

Line 275: what is "small geometry" ? "compact design " ?

Line 298: "After introducing the ...widths became.."

Kind regards