

Interactive comment on “Ideas: Photoelectrochemical carbon removal as negative emission technology” by Matthias M. May and Kira Rehfeld

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This is a totally appropriate paper for this forum. The authors take a big picture view of the need to also remove CO₂ from the atmosphere as well as to stop adding it. A fact that is not being discussed as widely as it should be. The contribution is well written and well reasoned and does supply some "back of the envelope" calculations to emphasize their points albeit with admitted optimistic assumptions. I have several comments and suggestions:

1. I do find it unlikely that anyone who is investing substantial energy in a CO₂ reduction product, that also has fuel value, can be persuaded to sequester the product. Even the

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first reduced product, formate, that has the highest potential for efficiency is essentially a hydrogen carrier.

2. On page 2 line 19 they suggest that the reduced products could be used as precursors to "organic construction materials". Given the scale of what would be needed it would be unlikely that such a huge market for such a material would exist. And if so it would have to be something much cheaper than could be justified from the cost of the electrons needed to reduce the CO₂. Large subsidies might be needed to make this possible.

3. I would like to see the authors include oxalate in their analysis since this requires only one electron per CO₂ and could be stored as solid oxalic acid dihydrate by concentrating the reduced brine or as precipitated calcium oxalate if a calcium source other than CaCO₃ or limestone could be used such as CaCl₂ from the ocean or other natural brines.

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