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MATHEMATICAL, PHYSICAL & ENGINEERING SCIENCES

General Discussion

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General discussion

I. Hutcheon. Hydrocarbon compounds which act as reducing agents of other species need to be soluble. Oxidation simply requires variable H:C ratios, not necessarily O_2. Are other reactants available?

A. C. Aplin. Solid–solid reactions are difficult to explain. We do need soluble compounds. Hydrogen balances can also be difficult to explain.

S. J. Rowland. Sulphur incorporation into phytol is driven by trimethylamine – a water-soluble compound. It catalyses the reaction even though it is a small molecule.

A. Brown. Work in peat bogs has shown that it is difficult to measure 'free' H_2. It is very near to the detection limit. Hydrogen changes species thus is not free. It is held as a co-enzyme. A similar situation may exist in organic-rich sediments.

J. Small. In experiments in which organic matter is degraded, H_2 is evolved. The evidence suggests aqueous organics generate H_2, which then has an influence on redox reactions.

C. D. Curtis. What about chlorite formation at higher temperatures?

M. L. Coleman. Fe^{3+} and reduced sulphur are available at depth. How unambiguously can we recognize the products of these potentially reactive species? Can we recognize the origin of Fe and S and can we determine the timing/temperature of formation of the products?

A. C. Aplin. In the Gulf Coast some authigenic chlorites indicate reduction has occurred but the source of reductants is not clear (low organic content). The loss of illite/smectite is potential evidence. Timing is problematic and mass balances difficult. It is also difficult to distinguish different pyrite origins from petrography, especially in mudrocks.

C. D. Curtis. Mössbauer spectroscopy and TEM studies demonstrate, fairly unambiguously, Fe reduction and chlorite formation at specific depth in the Gulf Coast (Rachel Davey). The reducing agent involved remains, as you say, problematical!

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