Modern Studies on Primodially Inspired Routes to the $Fe_2(SR)_2(CO)_6$ Core in the Fe-Only Hydrogenases

Christine A. Boyke, Rachel C. Linck, Bradford J. Gorecki, Thomas B. Rauchfuss

Department of Chemistry, University of Illinois, Champaign-Urbana

One of the most intriguing questions in bio-organometallic chemistry concerns the biosynthesis of metal carbonyls. Geophysicists have demonstrated that $Fe_2(SR)_2(CO)_6$ forms upon the vigorous reaction of Fe metal and thiols, using formic acid as a CO source. In classical organometallic chemistry, these diiron dithiolates form with high efficiency via the reaction of thiols with $Fe_3(CO)_{12}$, but we do not envision that such iron(0) carbonyls are biosynthetically relevant. Indeed Reihlen *et al.* long ago demonstrated that ferrous sulfate, thiols, and CO react to give modest yields of the same diiron species.

In this poster we will critically review these earlier methods and describe novel ($\pm 10^9$ years) routes to $Fe_2(SR)_2(CO)_6$. Beyond their biosynthetic and evolutionary implications, these results are relevant to the preparation of ^{57}Fe-labeled models.