

Inorganic Seminar: Iron Casting Call: Fe Thiolate and Amido Catalysts Featuring Hemilabile SNS Ligands

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In our efforts to develop new bifunctional iron catalysts, we have been investigating sterically svelte tridentate ligands with a combination of ‘hard’ nitrogen and ‘soft’ sulfur donors.¹ Our easily prepared SNS ligands and their corresponding metal complexes allow for a comparison of thiolate and amido first-coordination-sphere bases in bifunctional catalysis. Highlights include: 1) C-S bond activation, yielding stable Fe complexes with mono- and dianionic SNC ligands (Fig. 1) that serve as effective catalyst precursors for amine-borane dehydrogenation; 2) Fe-induced imine coupling that affords an FeN₂S₂ complex (Fig. 2) that effects selective aldehyde hydroboration using pinacolborane.²

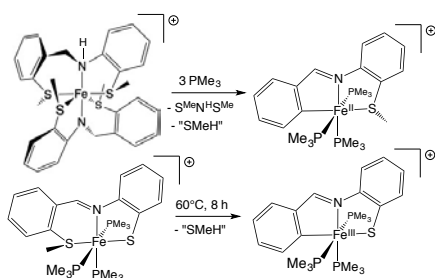
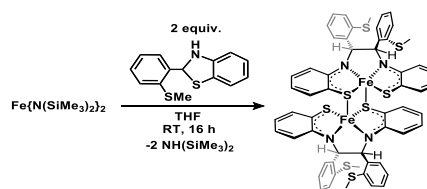


Figure 1

Figure
2

¹Das, U. K.; Daifuku, S. L.; Gorelsky, S. I.; Korobkov, I.; Neidig, M. L.; Baker, R. T. *Inorg. Chem.* **2015**, *55*, 987-997.

²Das, U. K.; Korobkov, I.; Gabidullin, B.; Baker, R. T. *Adv. Synth. Catal.* **2016**, in press; invited submission for Base Metal Catalysis special issue.



Tom Baker obtained his B.Sc. (Honours) in Chemistry (1975) from UBC and Ph.D. in Inorganic Chemistry (1980) from UCLA (Fred Hawthorne, advisor). After a postdoctoral stint with Philip Skell at Penn State working on metal atom chemistry and EPR spectroscopy, Tom spent fifteen years at DuPont CR&D developing applications of homogeneous catalysis to fluorochemicals, titanium dioxide, and nylon intermediates. In 1996 he joined the Chemistry division at Los Alamos National Laboratory where he led projects in bifunctional and multiphase catalysis approaches for alkane functionalization and chemical hydrogen storage and production. In 2008 Baker joined the Chemistry Department at uOttawa as Tier 1 Canada Research Chair in Catalysis Science for Energy Applications and Director of the Centre for Catalysis Research and Innovation. He is a founding member of the US NSF-funded Center for Enabling New Technology through Catalysis (CENTC), member of NSERC's H2CAN research network, a theme leader of the Lignoworks Biomaterials and Chemicals network and initiator of the green hydrofluorocarbons project. In 2009 Baker was appointed Fellow of the American Association for the Advancement of Science and in 2011 he received the Canadian Institute of Chemistry's Green Chemistry and Engineering award. In 2013 he was presented with the Kalev Pugi award from the Canadian chapter of the Society of Chemical Industry. Current research interests are centered around catalysis for conversion of renewable resources to value-added chemicals and materials, new tandem catalysis processes and green routes to hydrofluorocarbons.