

Dr. J. D. Wilton-Ely, Imperial College London
Multimetallic Assemblies using a Bifunctional Dithiocarbamate

Dithiocarbamate complexes are known for all transition metals [1]. Given this versatility, their well-defined architecture and redox properties, it is surprising that they have found limited use in supramolecular chemistry. We have recently utilised the reaction of piperazine (1) with carbon disulphide to afford a zwitterionic product (2), in which one end is activated towards metals as a dithiocarbamate unit (to form 3), while the other is protected as a protonated amine. Deprotonation of the amine and subsequent reaction with CS₂ allows the other end of the molecule to be activated when required (4). This methodology has enabled us to construct multimetallic materials (5-10) in a modular, step-wise fashion [2,3].

In order to demonstrate the versatility of our methodology for the fabrication of multimetallic materials, we have successfully constructed trimetallic species from all the transition-metal elements in group 8 (figure below) as well those of the first row in the periodic table (Fe, Co, Ni). The diagonal triad of Fe, Rh and Pt has also been incorporated into the same molecule.

These species were characterised by multinuclear NMR, IR, elemental analysis and, in particular, FAB mass spectrometry. Though generally well behaved, the products did not produce single crystals suitable for X-ray analysis so the combination of elemental analysis and FAB mass spectrometry was key to establishing their formulation.

[1] G. Hogarth, *Prog. Inorg. Chem.* **2005**, *53*, 71-561.

[2] J. D. E. T. Wilton-Ely, D. Solanki, E. R. Knight, K. B. Holt, A. L. Thompson, G. Hogarth, *Inorg. Chem.*, 2008, **47**, 9642-9653.

[3] M. J. Macgregor, G. Hogarth, A. L. Thompson, J. D. E. T. Wilton-Ely, *Organometallics*, 2009, **28**, 197, 208.



