

Conrad Goodwin  
Research Fellow  
Inorganic Chemistry Group



## Overview

The Goodwin Group works in the Department of Chemistry at the University of Manchester to further our understanding of the f-block elements – lanthanides and actinides.

The research focuses on non-aqueous chemistry to realise well-defined coordination geometries with which to stabilise highly reactive and unusual oxidation states and bonding motifs.

## Research outputs

### Ligand-Metal Complementarity in Rare-Earth and Actinide Chemistry

Goodwin, C. A. P. & Corbey, J. F., 27 May 2024, In: *Inorganic Chemistry*. 63, 21, p. 9355-9362 8 p.

### What is a Sandwich Complex?

Goodwin, C. A. P., 27 May 2024, In: *Inorganic Chemistry*. 63, 21, p. 9363-9365 3 p.

### N-Heterocyclic Carbene to Actinide d-Based $\pi$ -bonding Correlates with Observed Metal–Carbene Bond Length Shortening Versus Lanthanide Congeners

Goodwin, C. A. P., Adams, R. W., Gaunt, A. J., Hanson, S. K., Janicke, M. T., Kaltsoyannis, N., Liddle, S. T., May, I., Miller, J. L., Scott, B. L., Seed, J. A. & Whitehead, G. F. S., 17 Apr 2024, In: *Journal of the American Chemical Society*. 146, 15, p. 10367–10380 14 p.

### What is a Sandwich Complex?

Goodwin, C. A. P., 11 Mar 2024, In: *Organometallics*. 43, 5, p. 595-597 3 p.

### Carbene Complexes of Neptunium

Goodwin, C., Wooles, A., Murillo, J., Lu, E., Boronski, J., Scott, B. L., Gaunt, A. J. & Liddle, S., 24 May 2022, In: *American Chemical Society. Journal* . 144, 22, p. 9764-9774

### 2.2.2-Cryptand complexes of neptunium(III) and plutonium(III)

Goodwin, C. A. P., Ciccone, S. R., Bekoe, S., Majumdar, S., Scott, B. L., Ziller, J. W., Gaunt, A. J., Furche, F. & Evans, W. J., 20 Jan 2022, In: *Chemical Communications*. 58, 7, p. 997-1000 4 p.

### [AnI<sub>3</sub>(THF)4] (An = Np, Pu) Preparation Bypassing An<sup>0</sup> Metal Precursors: Access to Np<sup>3+</sup>/Pu<sup>3+</sup> Nonaqueous and Organometallic Complexes

Goodwin, C., Janicke, M. T., Scott, B. L. & Gaunt, A., 15 Dec 2021, In: *Journal of the American Chemical Society*. 143, 49 , p. 20680-20696 17 p.

### Isolation and characterization of a californium metallocene

Goodwin, C. A. P., Su, J., Stevens, L. M., White, F. D., Anderson, N. H., Auxier, J. D., Albrecht-Schönzart, T. E., Batista, E. R., Briscoe, S. F., Cross, J. N., Evans, W. J., Gaiser, A. N., Gaunt, A. J., James, M. R., Janicke, M. T., Jenkins, T. F., Jones, Z. R., Kozimor, S. A., Scott, B. L. & Sperling, J. M. & 4 others, Wedal, J. C., Windorff, C. J., Yang, P. & Ziller, J. W. , 18 Nov 2021, In: *Nature*. 599, p. 421-424 4 p., 7885.

### Structural and Spectroscopic Comparison of Soft-Se vs. Hard-O Donor Bonding in Trivalent Americium/Neodymium Molecules

Goodwin, C. A. P., Schlimgen, A. W., Albrecht-Schönzart, T. E., Batista, E. R., Gaunt, A. J., Janicke, M. T., Kozimor, S. A., Scott, B. L., Stevens, L. M., White, F. D. & Yang, P., 12 Apr 2021, In: *Angewandte Chemie - International Edition*. 60, 17, p. 9459-9466 8 p.

**Isolation and electronic structures of derivatized manganocene, ferrocene and cobaltocene anions**

Goodwin, C., Giansiracusa, M., Greer, S., Nicholas, H., Evans, P., Vonci, M., Hill, S., Chilton, N. & Mills, D., 14 Dec 2020, In: *Nature Chemistry*. 13, 3, p. 243-248 6 p., 0.

**Blocking like it's hot: A synthetic chemists' path to high-temperature lanthanide single molecule magnets**

Goodwin, C. A. P., 7 Nov 2020, In: *Dalton Transactions*. 49, 41, p. 14320-14337 18 p.

**Strangely attractive: Collaboration and feedback in the field of molecular magnetism**

Goodwin, C. A. P., Ortú, F. & Reta, D., 15 Jul 2020, In: *International Journal of Quantum Chemistry*. 120, 14, p. 1-8 8 p., e26248.

**Heteroleptic Samarium(III) Chalcogenide Complexes: Opportunities for Giant Exchange Coupling in Bridging  $\sigma$ - and  $\pi$ -Radical Lanthanide Dichalcogenides**

Goodwin, C., Reant, B., Vettese, G. F., Kragskow, J., Giansiracusa, M., DiMucci, I. M., Lancaster, K. M., Mills, D. & Sproules, S., 1 Jun 2020, In: *Inorganic Chemistry*. 59, 11, p. 7571–7583

**[Am(C<sub>5</sub>Me<sub>4</sub>H)<sub>3</sub>]: An Organometallic Americium Complex**

Goodwin, C. A. P., Su, J., Albrecht-Schmitt, T. E., Blake, A. V., Batista, E. R., Daly, S. R., Dehnen, S., Evans, W. J., Gaunt, A. J., Kozimor, S. A., Lichtenberger, N., Scott, B. L. & Yang, P., 19 Aug 2019, In: *Angewandte Chemie - International Edition*. 58, 34, p. 11695-11699 5 p.

**Terbocenium: completing a heavy lanthanide metallocenium cation family with an alternative anion abstraction strategy**

Goodwin, C., Reta, D., Ortú, F., Liu, J., Chilton, N. & Mills, D., 25 Aug 2018, In: *Chemical Communications*. 54, 66, p. 9182-9185 4 p.

**Heteroleptic Samarium(III) Halide Complexes Probed by Fluorescence-Detected L<sub>3</sub>-Edge X-ray Absorption Spectroscopy**

Goodwin, C., Reant, B., Kragskow, J. G. C., DiMucci, I. M., Lancaster, K. M., Mills, D. & Sproules, S., 21 Aug 2018, In: *Dalton Transactions*. 47, 31, p. 10613-10625 13 p.

**Exploring Synthetic Routes to Heteroleptic U<sup>III</sup>, U<sup>IV</sup> and Th<sup>IV</sup> Bulky Bis(silyl)amide Complexes**

Goodwin, C., Tuna, F., McInnes, E. & Mills, D., 2018, In: *European Journal of Inorganic Chemistry*. 20-21

**Molecular magnetic hysteresis at 60 K in dysprosocenium**

Goodwin, C., Ortú, F., Reta, D., Chilton, N. & Mills, D., 24 Aug 2017, In: *Nature*. 548, p. 439-442

**Investigation into the Effects of a Trigonal Planar Ligand Field on the Electronic Properties of Lanthanide(II) Tris(silylamine) Complexes (Ln = Sm, Eu, Tm, Yb)**

Goodwin, C., Chilton, N., Natrajan, L., Boulon, M.-E., Ziller, J. W., Evans, W. J. & Mills, D., 1 May 2017, In: *Inorganic Chemistry*.

**Silylamides: towards a half-century of stabilising remarkable f-element chemistry**

Goodwin, C. & Mills, D., 2017, *Organometallic Chemistry*. Royal Society of Chemistry, Vol. 41.

**Synthesis and Electronic Structures of Heavy Lanthanide Metallocenium Cations**

Goodwin, C., Reta, D., Ortú, F., Chilton, N. & Mills, D., 2017, In: *American Chemical Society. Journal*.

**Physicochemical Properties of Near-Linear Lanthanide(II) Bis(silylamine) Complexes (Ln = Sm, Eu, Tm, Yb)**

Goodwin, C. A. P., Chilton, N. F., Vettese, G. F., Moreno Pineda, E., Crowe, I. F., Ziller, J. W., Winpenny, R. E. P., Evans, W. J. & Mills, D. P., 17 Oct 2016, In: *Inorganic Chemistry*. 55, 20, p. 10057–10067 11 p.

**Salt metathesis versus protonolysis routes for the synthesis of silylamine Hauser base (R<sub>2</sub>NMgX; X = halogen) and amido-Grignard (R<sub>2</sub>NMgR) complexes**

Goodwin, C. A. P., Smith, A., Ortú, F., Vitorica-Yrezabal, I. J. & Mills, D. P., 5 Aug 2015, In: *Dalton Transactions*.

**Homoleptic Trigonal Planar Lanthanide Complexes Stabilized by Superbulky Silylamide Ligands**

Goodwin, C. A. P., Joslin, K. C., Lockyer, S. J., Formanuk, A., Morris, G. A., Ortú, F., Vitorica-Yrezabal, I. J. & Mills, D. P., 2015, In: Organometallics. 34, 11, p. 2314-2325 12 p.

**[U<sub>3</sub>(N(SiMe<sub>2</sub>tBu)<sub>2</sub>)<sub>3</sub>]: A Structurally Authenticated Trigonal Planar Actinide Complex**

Goodwin, C. A. P., Tuna, F., McInnes, E. J. L., Liddle, S. T., McMaster, J., Vitorica-Yrezabal, I. J. & Mills, D., 2014, In: Chemistry: A European Journal. 20, 45, p. 14579-14583 4 p.

## Prizes

**Royal Society University Research Fellowship**

Goodwin, C. (Recipient), 2021

**Dalton Emerging Researcher Award**

Goodwin, C. (Recipient), 2018

**J. Robert Oppenheimer Distinguished Postdoctoral Fellowship**

Goodwin, C. (Recipient), 2018

**EPSRC Doctoral Prize Fellowship**

Goodwin, C. (Recipient), 2017