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Penny Brothers was born and grew up in Auckland, New Zealand, and completed BSc and MSc(Hons) degrees in chemistry at the University of Auckland. In 1979 she was awarded a Fulbright Fellowship and set off for Stanford University to begin a PhD in chemistry under the supervision of Professor Jim Collman. Her PhD thesis, and much of her subsequent research work, has centered around the chemistry of porphyrin complexes. In 1986 she returned to Auckland and spent two years working as a postdoctoral fellow with Professor Warren Roper in the Department of Chemistry, focussing on organometallic chemistry. In 1988 she took up an current academic position at the University of Auckland, and was promoted to Professor in 2009. She moved to her current position as Director of the Research School of Chemistry at the Australian National University in 2019. She has been a visiting scientist at Los Alamos National Laboratory (2003, 2005, 2007) and a visiting professor at the University of California at Davis (1993), the University of Heidelberg (2003), the University of Burgundy (2004, 2006), the University of Münster (2010), Peking University (2011), the University of California at Berkeley (2014) and the University of Tromsø (2016-2018). She was awarded a Fulbright Senior Scholar Award in 2007 and served as President of the New Zealand Institute of Chemistry in 2017. She is currently a Principal Investigator in the MacDiarmid Institute for Advanced Nanomaterials, on the Marsden Fund Council and an Associate Editor of *Chemical Communications*. Her current research combines her interests in porphyrin chemistry, the main group elements and organometallic chemistry. She is currently investigating the chemistry of boron coordinated to porphyrin and corrole ligands, BODIPY fluorophores for sugar recognition and surface patterning using molecular pentagons.

Representative Publications

1. Tetrahedral pegs in square holes: stereochemistry of diboron porphyrazines and phthalocyanines. Tay, A. C. Y.; Frogley, B.; Ware, D. C.; Conradie, J.; Ghosh, A.; Brothers, P. J. *Angew. Chem. Int. Ed.* **2019**, *58*, 3057-3061.
2. Boron calixphyrin complexes: exploring the coordination chemistry of a BODIPY/porphyrin hybrid. Tay, A. C. Y.; Frogley, B. J.; Ware, D. C.; Brothers, P. J. *Dalton Trans.* **2018**, *47*, 3388-3399.
3. Lighting up sugars: fluorescent BODIPY-gluco-furanose and -septanose conjugates linked by direct B-O-C bonds. Liu, B.; Novikova, N.; Simpson, M. C.; Timmer, M. S.; Stocker, B. L.; Söhnel, T.; Ware, D. C.; Brothers, P. J. *Org. Biomolec. Chem.* **2016**, *14*, 5205-5209.
4. Mono- and diboron corroles: factors controlling stoichiometry and hydrolytic reactivity. Albrett, A. M.; Thomas, K. E.; Maslek, S.; Mlodzianowska, A.; Conradie, J.; Beavers, C. M.; Ghosh, A.; Brothers, P. J. *Inorg. Chem.* **2014**, 53, 5486–5493.

Lighting up sugars and other adventures with boron pyrrole ligands

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In this International Year of the Periodic Table, porphyrins stand out as ligands which can coordinate an extraordinary number of elements. Most adopt the conventional coordination modes in which the element resides in the N_4 hole of the ligand, the quintessential example being iron porphyrin in hemoglobin. However, the small, light element boron stands out by being different – two borons can coordinate in the hole as in the FBOBF porphyrin shown in Fig. 1. We have studied this chemistry extensively with a range of ligands from the tetrapyrrole family and observe unusual chemistry for both boron and the ligand.[1] For example, a boron corrole contains a Ph-B-H-B-Ph group threaded through the N_4 hole (Fig. 2).

More recently, we have used our experience manipulating the chemistry of boron in pyrrole ligands to investigate new applications of the highly fluorescent BODIPY (which can be imagined as half of a diboron porphyrin). As an example we have explored the direct connection of O-BODIPY to carbohydrates through B-O-C links and have produced examples of BODIPY saccharide complexes, shown in cartoon form in Fig. 3.[2] We have also incorporated BODIPY into a cobalt complex capable photocatalytic hydrogen production.

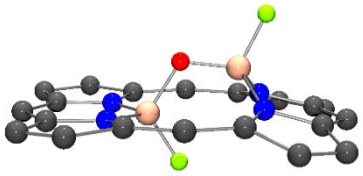

Fig. 1. B_2OF_2(porphyin)

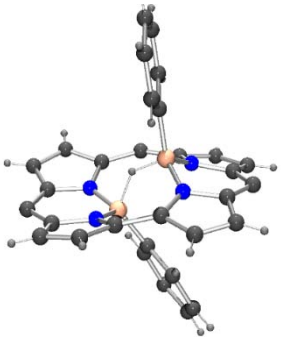

Fig. 2. B_2HPh_2(corrole)

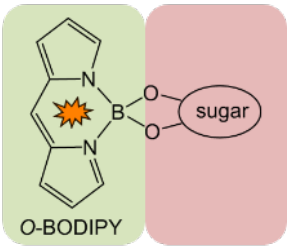

Fig. 3. BODIPY-sugar

1. Boron complexes of pyrrolyl Ligands. Brothers, P. J. *Inorg. Chem.* 2011, *50*, 12374-12386.
2. Lighting up sugars: fluorescent BODIPY-gluco-furanose and -septanose conjugates linked by direct B-O-C bonds. Liu, B.; Novikova, N.; Simpson, M. C.; Timmer, M. S.; Stocker, B. L.; Söhnel, T.; Ware, D. C.; Brothers, P. J. *Org. Biomolec. Chem.* 2016, *14*, 5205-5209.