

Diboron porphyrins and corroles: unexpected chemistry for both boron and the ligands

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Over recent years we have investigated the chemistry of boron porphyrins, which are unique in containing two boron atoms per porphyrin ligand. Highlights have been the development of a series of complexes, a diboryl porphyrin, a diboranyl porphyrin containing a B-B bond which forms through spontaneous reductive coupling of the diboryl under certain conditions, and a further diboranyl complex which is an unusual example of an isophlorin in which the porphyrin ligand has been reduced. A number of complexes containing oxygen-bridged BOB units have also been prepared. Our most recent work extends the coordination chemistry of boron to the corrole ligand. Although corroles and porphyrins are closely related, we observe some significant differences in the boron chemistry. The more constrained hole size of corrole leads to cisoid stereochemistry in the FBOBF corrole anion (Figure), compared to transoid for the related FBOBF porphyrin. We have also isolated boron hydride corrole complexes, including an unusual example of a complex containing a B-H-B group coordinated to the cavity in the corrole. The experimental work for the boron porphyrin and corrole work has been supported by extensive DFT calculations. Recent experimental results will be described, along with potential applications of the boron porphyrin complexes.

