

AUSTRALIAN JOURNAL OF CHEMISTRY

AN INTERNATIONAL JOURNAL FOR CHEMICAL SCIENCE

RESEARCH FRONT: Single Crystal to Single Crystal Transformations

Foreword

Single Crystal to Single Crystal Transformations

L. J. Barbour

Aust. J. Chem. **2006**, *59*, 595–596.

A crystal is not a chemical cemetery—a significant degree of dynamic behaviour occurs in the solid state. This phenomenon is even more surprising when astonishingly fluid changes occur within the crystal without loss of mosaicity.

Review

Single Crystal to Single Crystal Structural Transformations in Molecular Framework Materials

Gregory J. Halder, Cameron J. Kepert

Aust. J. Chem. **2006**, *59*, 597–604.

The rapid recent advancements in the generation of nanoporous materials from molecular frameworks has motivated the development of new techniques to characterize these novel and highly complex materials. In this review we highlight some of the relatively rare cases where single crystal diffraction has been used to characterize the guest-dependent structures of molecular frameworks through the investigation of single crystal to single crystal (SC-SC) transformations.

Current Chemistry

Recent Advances in the Dynamics of Single Crystal to Single Crystal Transformations in Metal–Organic Open Frameworks

Myunghyun Paik Suh, Young Eun Cheon

Aust. J. Chem. **2006**, *59*, 605–612.

Compounds that undergo (reversible) SC-SC transformations are important for the development of new and technologically useful materials. Here, several examples of SC-SC transformations that occur in metal–organic open frameworks (MOFs) upon guest removal, rebinding, and exchange, and chemical oxidation are discussed. The changes undergone by the MOF to preserve the single crystallinity are highlighted.

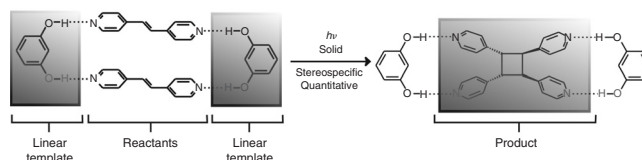
Communication

A Step Towards a [2.2]Paracyclophane: A Single Crystal to Single Crystal Reaction Involving a Hydrogen-Bonded Molecular Assembly with Multiple Reaction Centres

*Tomislav Friščić,
Leonard R. MacGillivray*

Aust. J. Chem. **2006**, *59*, 613–616.

An advance in understanding the role of SC-SC reactions in supramolecular chemistry has been gained, particularly in relation to performing organic synthesis in the solid state. Here, a radiation technique has been successfully applied to a hydrogen-bonded molecular assembly that involves a diolefin that reacts to form a monocyclized intermediate of a [2.2]paracyclophane. These results suggest that SC-SC reactions can be achieved in molecular assemblies of increasing structural complexity.

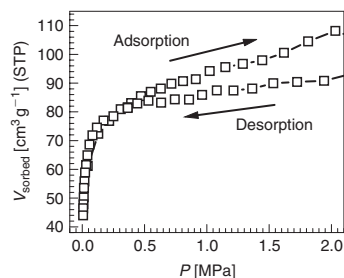


Full Paper

[Zn₃(HCOO)₆]: A Porous Diamond Framework Conformable to Guest Inclusion

Zheming Wang, Yanjuan Zhang,
Mohamedally Kurmoo, Tao Liu,
Serge Vilminot, Bin Zhao, Song Gao

Aust. J. Chem. **2006**, 59, 617–628.



Conformity is realized for a novel metal–organic framework consisting of a diamondoid zinc formate, [Zn₃(HCOO)₆] (guest), and demonstrated by single crystal to single crystal transformation without deterioration. [Zn₃(HCOO)₆] has been tested for its hydrogen storage capacity for the safe transportation of this environmentally friendly energy source. Although the capacity is moderate, it does not meet the standard requirements.

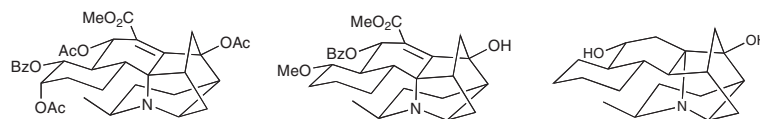
Full Papers

The Absolute Stereochemistry of the *Galbulimima* Alkaloids

Anthony C. Willis, Patrick D. O'Connor,
Walter C. Taylor, Lewis N. Mander

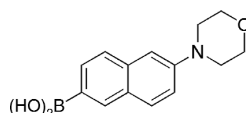
Aust. J. Chem. **2006**, 59, 629–632.

Long-standing assumptions regarding the absolute stereochemistry of the more complex alkaloids isolated from the rainforest tree *Galbulimima belgraveana* have proven to be invalid. X-ray crystal structures have been determined for three of the more complex alkaloids, thereby allowing the correct absolute configuration to be established for these three compounds and 15 further alkaloids from this source.

**A General, Modular Approach to a New Family of Amine-Substituted Arylboronic Acid Saccharide Chemosensors**

Bryan M. Schertzer, Sheila N. Baker,
Steven T. Diver, Gary A. Baker

Aust. J. Chem. **2006**, 59, 633–639.

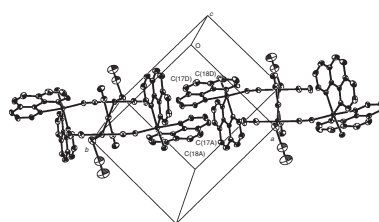


The use of sugar sensors is important for many medicinal and industrial applications. Here, a generic and very versatile synthesis is reported towards a new class of push–pull intramolecular charge transfer saccharide probes whose interaction with *cis*-diols results in a dramatic chelation-enhanced static quenching. The model compound synthesized here (shown) also possesses high quantum yield, water solubility, and photostability.

Heteropolymetallic Supramolecular Solid-State Architectures Constructed from Dicyanoaurate Ion, Phen, and 3d Metals

Gong-Feng Xu, Zhan-Quan Liu,
Hui-Bo Zhou, Yang Guo,
Dai-Zheng Liao

Aust. J. Chem. **2006**, 59, 640–646.

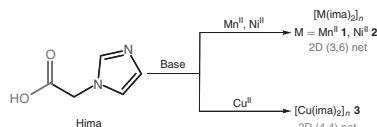


Two new supramolecular polymeric coordination complexes were obtained through self-assembly of [Au(CN)₂][−], phen, and transition metals. Syntheses, structures, and spectroscopic properties are described. Gold atoms linked with aurophilic bonds arrange in pattern not frequently observed. Such highly dimensional systems can show novel magnetic, nonlinear optical, or conductive properties.

Metal-Controlled Assembly Tuning Coordination Polymers with Flexible 2-(1*H*-imidazole-1-yl)acetic Acid (Hima)

Yong-Tao Wang, Gui-Mei Tang,
Da-Wei Qin

Aust. J. Chem. **2006**, 59, 647–652.



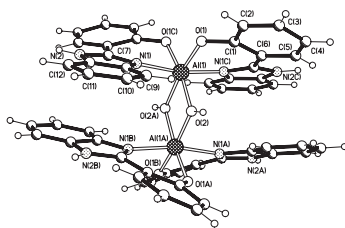
Three new inorganic–organic coordination polymers, based on a versatile linking unit Hima and divalent metal ions, form two-dimensional structures with differing topologies. The ima anion exhibits different coordination modes. These results indicate that the versatile nature of this flexible ligand and the coordination preferences of the metal ions play a critical role in construction of these coordination polymers.

Communications

Syntheses, Structures, and Luminescent Properties of Isomorphous Hydroxo-Bridged Aluminum(III) and Indium(III) Compounds with 2-(2-Hydroxyphenyl)benzimidazole

Yi-Ping Tong, Shao-Liang Zheng,
Xiao-Ming Chen

Aust. J. Chem. **2006**, *59*, 653–656.



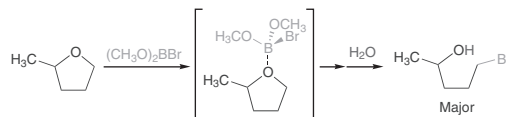
Two neutral isomorphous, dihydroxo-bridged Al(III) and In(III) complexes with chelate 2-(2-hydroxyphenyl)benzimidazole (Hpbm) $[(M(pbm)_2(\mu-OH))_2] \cdot 8C_2H_5OH \cdot 2H_2O$ have been prepared and characterized by X-ray crystallography, photoluminescent studies, and molecular orbital analyses. Such complexes demonstrate the use of a metal-tuning approach for the preparation of potential luminescent metal–organic materials with different emitting colours.

Regiocontrolled Opening of 2-Methyltetrahydrofuran with Various Boron Reagents

Chandra D. Roy

Aust. J. Chem. **2006**, *59*, 657–659.

Regioselective cleavage of unsymmetrical ether is a very interesting avenue to bifunctional molecules useful in organic synthesis. Regiocontrolled synthesis of primary bromide using newly synthesized reagent, dimethoxyboron bromide, is described. Convenient preparation and its reaction, easy workup, and high regioselectivity should make this reagent highly practical.



Focus

Di- and Tri-Nuclear Copper(II) Metalloclusters: Building Blocks for Supramolecular Chemistry

Jack K. Clegg

Aust. J. Chem. **2006**, *59*, 660.

The use of bis- β -diketonate ligand systems combined with copper(II) leads to the formation of new di- and trimeric metallo-structures with unsaturated metal centres. These ‘platforms’ can be treated with difunctional nitrogen donor ligands to produce interesting metallo-supramolecular assemblies. This synthetic route shows uncommon promise as a method for the construction of new metal–organic framework materials.