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RESEARCH FRONT: Silver(I) — a Crystal Engineering Renaissance

Essay

Silver Coordination Polymers — From Simple Complexes to Functional Networks

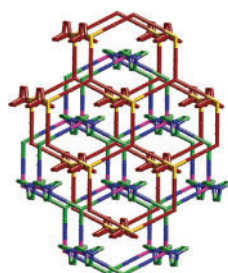
Edwin C. Constable

Aust. J. Chem. **2006**, *59*, 1–2.

Variable coordination numbers and geometries, interesting metal–ligand combinations, silver–silver interactions, and new applications have all led to the recent renaissance in silver coordination chemistry. Papers in this issue's Research Front explore just some of this fascinating diversity.

Review

Recent Advances in Supramolecular Design and Assembly of Silver(I) Coordination Polymers

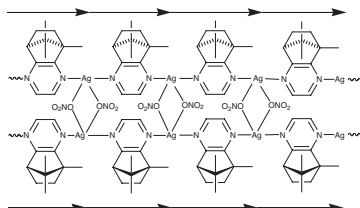
Chun-Long Chen, Bei-Sheng Kang,
Cheng-Yong Su*Aust. J. Chem.* **2006**, *59*, 3–18.

Crystal engineering aims for a predictable and controllable synthesis. In the case of silver(I) coordination polymers, the metal–ligand interactions are generally weak and labile. During supramolecular self-assembly processes, such weak bonds allow self-correction at the cost of a process influenced by subtle kinetic factors. Understanding silver(I) coordination polymers thus represents a great challenge to the crystal engineer.

Rapid Communications

Chiral Heterocyclic Ligands. XIII. Synthesis and X-Ray Crystal Structure of a Chiral, Unidirectional, Silver Coordination Polymer

Christopher M. Fitchett, Peter J. Steel

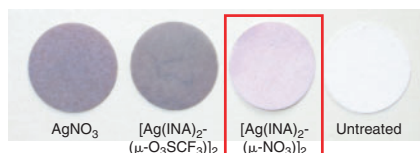
Aust. J. Chem. **2006**, *59*, 19–21.

A C_1 -symmetric chiral ligand is shown to react with silver nitrate to produce a new type of chiral coordination polymer with a unidirectional, ladder-like structure (shown). Crystal structure solution and refinement are presented.

[Ag(isonicotinamide)₂NO₃]₂ — a Stable Form of Silver Nitrate

Thomas Dorn, Katharina M. Fromm,
Christoph Janiak*Aust. J. Chem.* **2006**, *59*, 22–25.

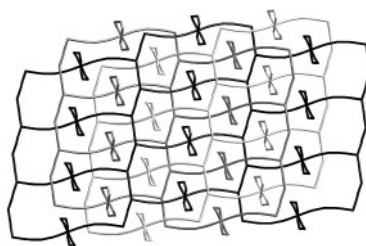
The title compound combines light stability in the solid state with a ready solubility and the effective formation of free, unligated Ag^+ ions in solution. It should therefore potentially act as a stabilized formulation of solid AgNO_3 . The graphic shows four filter papers impregnated with silver compounds and irradiated.



An Interpenetrating Coordination Polymer Containing Weak Hydrogen Bonds and Argentophilic Interactions

Martin B. Duriska, Stuart R. Batten,
David J. Price

Aust. J. Chem. **2006**, *59*, 26–29.



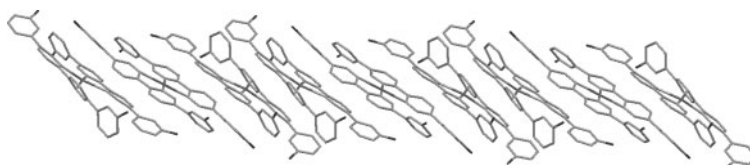
The structure of the coordination polymer $[\text{Ni}(\text{en})_2][\text{Ag}(\text{CN})_2]_2[\text{Ag}_2(\text{CN})_2]$ (en = ethylenediamine) contains two-dimensional (6,3) sheets which show 3-fold $2\text{D} \rightarrow 2\text{D}$ parallel interpenetration. The structure is reinforced by weak $\text{N}-\text{H}\cdots\pi(\text{CN})$ and argentophilic $\text{Ag}\cdots\text{Ag}$ interactions.

A Planar Silver(I) Complex with a ‘Simple’ 2,2’-Bipyridine Ligand

Edwin C. Constable,
Catherine E. Housecroft,
Benson M. Kariuki,
Christopher B. Smith

Aust. J. Chem. **2006**, *59*, 30–33.

Silver(I) provides no electronic preference for a particular coordination geometry, and observed structures are dominated by steric considerations. An example is provided here which reveals a coordination geometry controlled by additional supramolecular interactions.



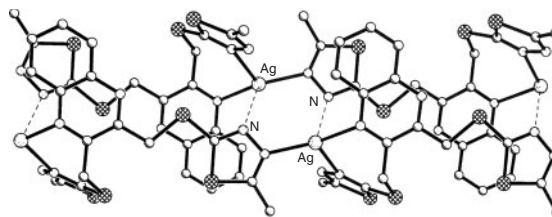
Full Papers

New Coordination Architectures of Dithioether Ligand with Silver Salts: Effect of Anions on Complex Structures

Ya-Bo Xie, Jian-Rong Li, Xian-He Bu

Aust. J. Chem. **2006**, *59*, 34–39.

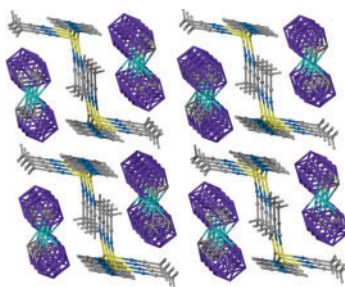
The silver(I)–nitrogen interaction is comparable in strength to hydrogen bonding. Supramolecular complexes containing this weak interaction can thus be subtly affected though steric and bonding influences of other entities — chemically similar systems can possess a wide range of structures.



Coordination Networks with Carborane Anions: Ag(I) and Nitrogen Bridging Ligands

Luis Cunha-Silva, Ruksanna Ahmad,
Michael J. Hardie

Aust. J. Chem. **2006**, *59*, 40–48.



Silver(I) coordination is renowned for its steric sensitivity. Silver coordinated by carboranes, bulky carbon–boron based anions, reveal a range of infinite one, two, and three dimensional structures. One of the structures features silver four-coordinate by nitrogen atoms. Unusually, none of these systems possess the commonly observed silver–silver bonds.

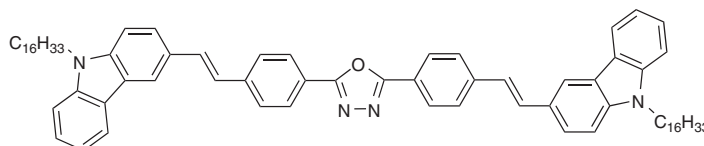
Rapid Communication

New Heterocycle-Based Organic Molecule with Two-Photon Induced Blue Fluorescent Emission

Pin Shao, Zhen Li, Jingui Qin,
Hongmei Gong, Sha Ding, Ququan Wang

Aust. J. Chem. **2006**, *59*, 49–52.

A heterocycle-based molecule containing oxadiazole and carbazole moieties has been synthesized. It is highly emissive because of symmetrical charge transfer of the donor–bridge–acceptor–bridge–donor framework. The twist conformation of 2,5-diphenyl-1,3,4-oxadiazole and the nature of the moderate electron donors enable it to exhibit two-photon induced blue emission.



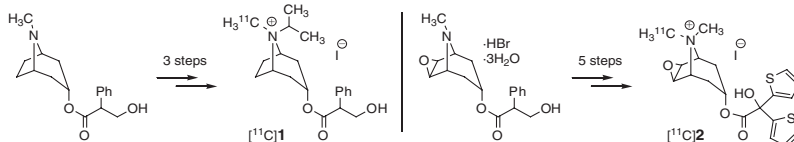
Full Papers

Synthesis and Radiolabelling of Ipratropium and Tiotropium for Use as PET Ligands in the Study of Inhaled Drug Deposition

Fatiah Issa, Michael Kassiou,
Hak-Kim Chan, Malcolm D. McLeod

Aust. J. Chem. **2006**, 59, 53–58.

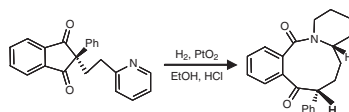
[^{11}C]Ipratropium ([^{11}C]**1**) and [^{11}C]tiotropium ([^{11}C]**2**) ligands for positron emission tomography applications have been described to study inhaled drug deposition associated with the treatment of chronic obstructive pulmonary disease and asthma. The synthesis, which involves the radiolabelling of tertiary amine precursors for both ligands by *N*-alkylation with $^{11}\text{CH}_3\text{I}$ in the final step, and characterization are reported herein.



Synthesis and Ring Cyclization–Expansion–Contraction Reactions of Some New 2,2-Disubstituted Indan-1,3-diones and Related Compounds

Craig J. Roxburgh, Lee Banting

Aust. J. Chem. **2006**, 59, 59–74.



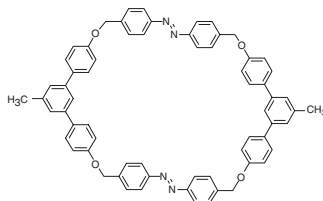
The marked analgesic activity discovered for the hydrochloride of 2-phenyl-2-[2-(2-piperidyl)ethyl]-4,5,6,7-tetrahydroindan-1,3-dione spurred an extensive study in which 38 new and structurally related compounds were prepared. The synthetic strategy evolves around a novel ring-cyclization–expansion reaction to yield 9–11-membered nitrogen-containing heterocycles.

Short Communication

Synthesis of Azobenzenophanes with a Large Molecular Cavity

Perumal Rajakumar, Beeran Senthilkumar,
Kannupal Srinivasan

Aust. J. Chem. **2006**, 59, 75–77.



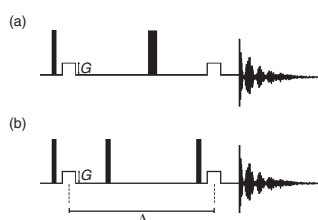
The synthesis of large-cavity azobenzenophanes containing *m*-terphenyl, aromatic carbonyl, or (*S*)-BINOL spacers is described. The *cis*–*trans* isomerization in these phanes provides a photochemical means of controlling the cavity dimensions and thus the phane's host–guest properties.

Focus

PGSE Diffusion NMR—An Emerging Technique for Inorganic/Organometallic Chemists

P. G. Anil Kumar

Aust. J. Chem. **2006**, 59, 78.



Some applications of the Pulsed Gradient Spin-Echo NMR technique in the field of inorganic chemistry are highlighted. Particular emphasis is given to probing ion-pairing, hydrogen bonding, and molecular volumes. Shown are typical pulse sequences for PGSE experiments: the pulsed gradient spin-echo and the stimulated echo sequences.

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