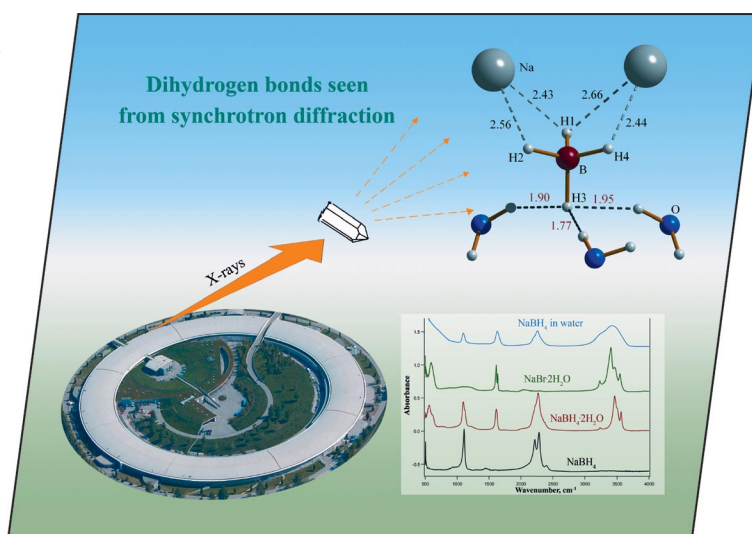


The EUChemSoc Societies have taken the significant step into the future by merging their traditional journals, to form two leading chemistry journals, the *European Journal of Inorganic Chemistry* and the *European Journal of Organic Chemistry*. Three further EUChemSoc Societies (Austria, Czech Republic and Sweden) are Associates of the two journals.

## COVER PICTURE

The cover picture shows the crystal structure of sodium borohydride dihydrate,  $\text{NaBH}_4 \cdot 2\text{H}_2\text{O}$ , determined from synchrotron diffraction on a single crystal. The European Synchrotron Radiation Facility (ESRF), shown in the lower left corner, provided the source of X-rays. The  $\text{BH}_4^-$  anion has a nearly ideal tetrahedral geometry. By applying the systematic correction to the positions of hydrogen atoms seen by X-rays, the geometry of the dihydrogen  $\text{O}-\text{H}^{\delta+} \cdots \delta^--\text{H}-\text{B}$  bonding was accurately characterized. The structure of anhydrous  $\text{NaBH}_4$  was also investigated by X-ray diffraction on a single crystal. Vibrational properties of  $\text{NaBH}_4 \cdot 2\text{H}_2\text{O}$  and related substances were studied by IR and Raman spectroscopy. Details are discussed in the article by Y. Filinchuk and H. Hagemann on p. 3127ff.



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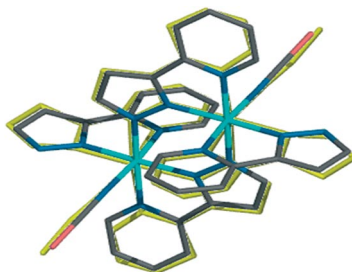
## MICROREVIEW

### Molecular Magnetism

K. S. Murray\* ..... 3101–3121

Advances in Polynuclear Iron(II), Iron(III) and Cobalt(II) Spin-Crossover Compounds

**Keywords:** Iron(II) / Iron(III) / Cobalt(II) / Spin-crossover / Polynuclear compounds / Magnetism / Photomagnetism



This Microreview gives an up-to-date account of the advances made by the author's group and by other groups, in recent years, on spin-crossover compounds of iron(II), iron(III) and cobalt(II) of the dinuclear cluster and 1-D chain types. As well as describing their syntheses, design, structures, magnetism and photomagnetism, a systematic delineation of the kinds and mechanisms of observed spin transitions is presented.

## SHORT COMMUNICATION

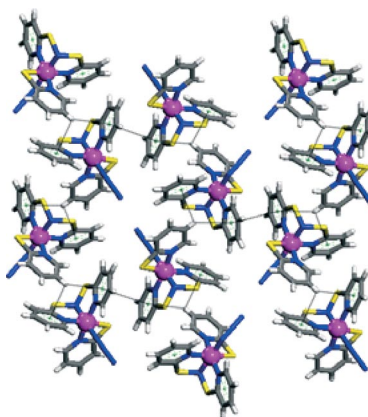
### An N-Inserted Disulfide Ligand

H. S. Yoo, J. H. Yoon, J. I. Kim,  
E. K. Koh, C. S. Hong\* ..... 3123–3126



Unprecedented N-Inserted Disulfide Ligand Stabilized by Coordination to the Electropositive Co<sup>III</sup> Center

**Keywords:** Cobalt / Crystal structure / S ligands / N ligands



The reaction of Co<sup>II</sup> and 2,2'-dipyridyldisulfide (PySSPy) in the presence of azide produced a monomeric complex [Co<sup>III</sup>-(PyS)(PyS-N-SPy)(N<sub>3</sub>)] (**1**), which was characterized by means of UV/Vis, X-ray crystallography, XPS, and cyclic voltammetry. The unusual, N-inserted ligand PyS-N-SPy can be stabilized through coordination to the electropositive Co<sup>III</sup> ion.

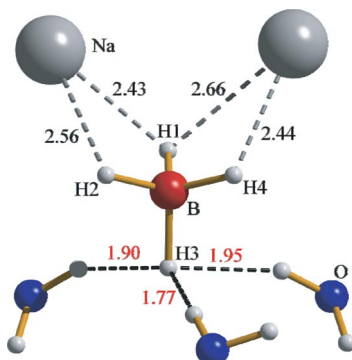
## FULL PAPERS

### Light-Metal Hydrides

Y. Filinchuk,\* H. Hagemann .... 3127–3133

Structure and Properties of NaBH<sub>4</sub>·2H<sub>2</sub>O and NaBH<sub>4</sub>

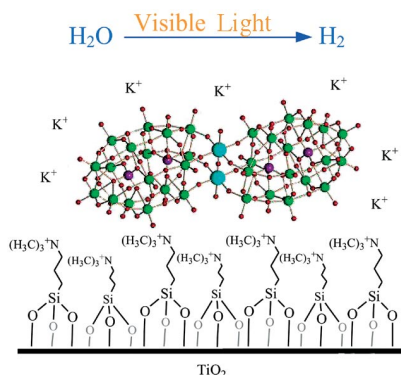
**Keywords:** X-ray diffraction / Vibrational spectroscopy / Hydrides / Hydrates / Hydrogen bonds



NaBH<sub>4</sub>·2H<sub>2</sub>O and NaBH<sub>4</sub> were studied by single-crystal X-ray diffraction and vibrational spectroscopy. Nearly ideal tetrahedral BH<sub>4</sub><sup>-</sup> anions are bridged with Na<sup>+</sup> ions through the edges. NaBH<sub>4</sub>·2H<sub>2</sub>O does not contain classical hydrogen bonds, but reveals strong O–H<sup>δ+</sup>...<sup>δ-</sup>H–B bonds. At 313–315 K, the structure decomposes into NaBH<sub>4</sub> and H<sub>2</sub>O, which react to form hydrogen gas.

## A Dawson-Type Polyoxometalate

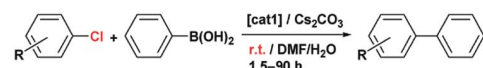
The reaction of  $[\alpha_2\text{-P}_2\text{W}_{17}\text{O}_{61}]^{10-}$  with  $[\text{Re}^{\text{IV}}\text{Cl}_6]^{2-}$  in water afforded  $\text{K}_{14}[\text{O}\{\text{Re}^{\text{V}}(\text{OH})(\alpha_2\text{-P}_2\text{W}_{17}\text{O}_{61})\}_2] \cdot 21\text{H}_2\text{O}$  (**K-1**), whose single-crystal X-ray structure analysis revealed overall  $C_{2h}$  symmetry. **K-1** was grafted onto a  $\text{TiO}_2$  surface by electrostatic binding to give  $\text{TiO}_2$  with a cationic quaternary ammonium moiety (**1**-grafted  $\text{TiO}_2$ ), which effected hydrogen evolution from water vapor under visible light irradiation.



**C. N. Kato,\* K. Hara, A. Hatano, K. Goto, T. Kuribayashi, K. Hayashi, A. Shinohara, Y. Kataoka, W. Mori, K. Nomiya** ..... 3134–3141

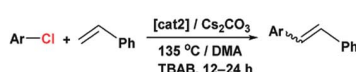
A Dawson-Type Dirhenium(V)-Oxido-Bridged Polyoxotungstate: X-ray Crystal Structure and Hydrogen Evolution from Water Vapor under Visible Light Irradiation

**Keywords:** Polyoxometalates / Rhenium / X-ray diffraction / UV/Vis spectroscopy / Photocatalysis



We present the syntheses and the molecular structures of novel palladacycles and their

catalytic activities in Suzuki and Heck reactions.



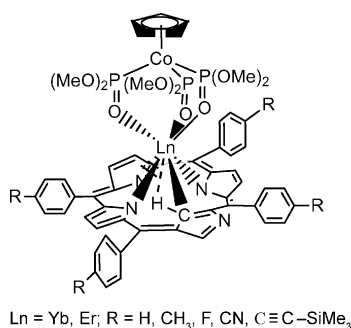
## Palladacycles in Coupling Reactions

**M.-T. Chen, C.-A. Huang, C.-T. Chen\*** ..... 3142–3150

Palladacyclic Complexes Containing C,N-Type Ligands as Catalysts in Cross-Coupling Reactions

**Keywords:** Metallocycles / N ligands / Suzuki reaction / Heck reaction / Palladium

Lanthanide complexes of *N*-confused porphyrins with different rare-earth metals and phenyl ring substituents are synthesized in which the tripodal cobaltate anion acts as an effective encapsulating agent for  $\text{Ln}^{3+}$  and an  $\eta^2$ -agostic interaction exists between the metal center and the inner C–H bond of the porphyrinate ligand.



## Lanthanide *N*-Confused Porphyrinates

**X.-J. Zhu, F.-L. Jiang, C.-T. Poon, W.-K. Wong,\* W.-Y. Wong** .... 3151–3162

Synthesis, Structure and Spectroscopic Properties of Lanthanide Complexes of *N*-Confused Porphyrins

**Keywords:** N ligands / Lanthanides / Porphyrinoids / Agostic interactions / Fluorescence

Sol–gel synthesis of cerium titanates with tunable  $\text{Ce}^{3+}/\text{Ce}^{4+}$  content, crystalline structure and optical properties are reported. XRD, Raman spectroscopy and magnetic measurements corroborate the crystallization of  $\text{CeO}_2\text{–TiO}_2$  mixed oxides or  $\text{Ce}_2\text{Ti}_2\text{O}_7$  pyrochlore phase. The  $\text{Ce}^{\text{III}}$  oxidation process affects the colouration, leading to ecological pigments with promising applications in catalysis.



## Rare-Earth Pyrochlores

**M. Martos\*, B. Julián-López, J. V. Folgado, E. Cordoncillo, P. Escribano** ..... 3163–3171

Sol–Gel Synthesis of Tunable Cerium Titanate Materials

**Keywords:** Sol–gel processes / Cerium / Rare-earth pyrochlore / Titanates / Nanostructures

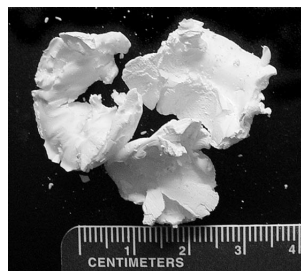
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## ZnO Nanostructures

J. Li,\* H. Peng, J. Liu,\*  
H. O. Everitt ..... 3172–3176

Facile Gram-Scale Growth of Single-Crystalline Nanotetrapod-Assembled ZnO Through a Rapid Process

**Keywords:** Nanocrystalline materials / Semiconducting materials / Nanotetrapods / Zinc oxide



From a facile catalyst-free method, pure single-crystalline nanotetrapod-assembled ZnO was grown on a gram-scale for the first time, with high repeatability and conversion efficiency. All four arms of the nanotetrapods are cone shaped and grow in the [001] direction. The photoluminescence properties were studied and a mechanism was suggested for the growth of the nanotetrapod-assembled ZnO.

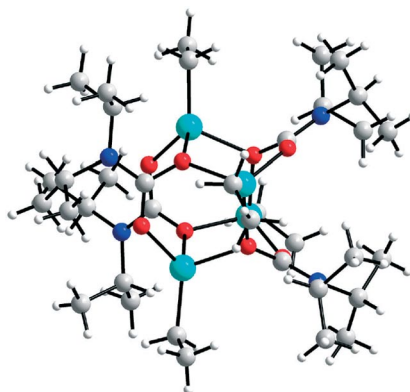
## ZnO Particle Precursors

D. Domide, E. Kaifer, J. Mautz,  
O. Walter, S. Behrens,  
H.-J. Himmel\* ..... 3177–3185



Synthesis and Characterisation of Some New Zinc Carbamate Complexes Formed by CO<sub>2</sub> Fixation and Their Use as Precursors for ZnO Particles under Mild Conditions

**Keywords:** CO<sub>2</sub> fixation / Zinc oxide / Precursor chemistry / Carbamate complexes



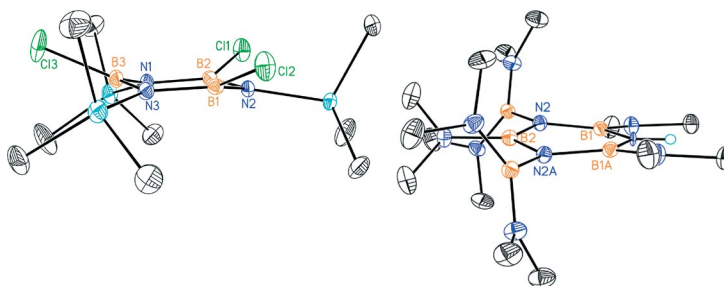
Alkylzinc carbamates suitable as precursors to ZnO nanosized particles under mild conditions are formed by CO<sub>2</sub> insertion into the Zn–N bonds of alkylzinc amides.

## Distorted Borazines

B. Anand, H. Nöth,\* H. Schwenk-Kircher,  
A. Troll ..... 3186–3199

Structural Chemistry of Borazines

**Keywords:** Borazines / Ring distortion



The BN bond lengths and the planar borazine ring are distorted in the solid state by substituents in three different ways: a) by retaining the planarity of the borazine ring but with substituents bent up and down the

ring, b) by substituents that induce different BN bond lengths and bond ring bond angles and c) by distortion of the borazine ring into a chair shaped or twisted ring.

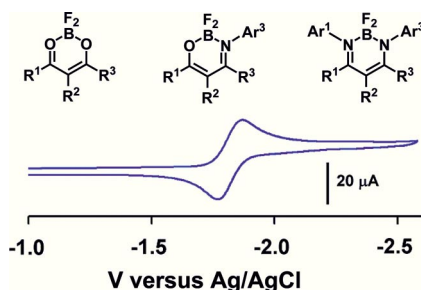
## Boron Chelate Complexes

F. P. Macedo, C. Gwengo, S. V. Lindeman,  
M. D. Smith, J. R. Gardinier\* ... 3200–3211



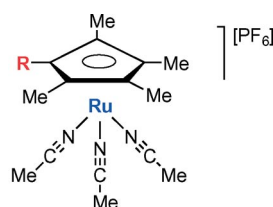
β-Diketonate, β-Ketoiminato, and β-Diiminato Complexes of Difluoroboron

**Keywords:** Chelates / Boron / Electrochemistry / UV/Vis spectroscopy / Density functional calculations



A series of β-diketonate, β-ketoiminato, and β-diiminato complexes of difluoroboron have been prepared to evaluate the effects of chelate ring substitution on the structural and electronic properties. The electron-accepting nature of the ligands likely facilitates unusual coordination chemistry.

$[\text{Ru}(\eta^5\text{-C}_5\text{Me}_4\text{R})(\text{MeCN})_3][\text{PF}_6]$  ( $\text{R} = t\text{BuCH}_2, i\text{Pr}, t\text{Bu}$  and  $\text{CF}_3$ ) complexes were synthesized and evaluated as catalysts for nucleophilic allylic substitution reactions.



$\text{R} = \text{CH}_2t\text{Bu}, i\text{Pr}, t\text{Bu}, \text{CF}_3$

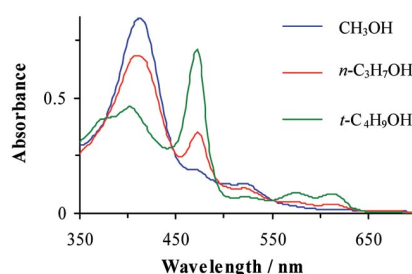
**H.-J. Zhang, B. Demerseman, Z. Xi,\***  
**C. Bruneau\*** ..... 3212–3217

Ruthenium Complexes Bearing Bulky Pentasubstituted Cyclopentadienyl Ligands and Evaluation of  $[\text{Ru}(\eta^5\text{-C}_5\text{Me}_4\text{R})(\text{MeCN})_3][\text{PF}_6]$  Precatalysts in Nucleophilic Allylic Substitution Reactions

**Keywords:** Allylation / Cyclopentadienyl ligands / Homogeneous catalysis / Regioselectivity / Ruthenium / Metallocenes

### Manganese Porphyrins

In the epoxidation of cyclooctene and *cis*-stilbene by tetra-*n*-butylammonium periodate and (tetraarylporphyrinato)manganese(III) in the presence of imidazole in  $\text{CH}_2\text{Cl}_2$ , the molecular size and acidity of the alcohols played important roles in determining the epoxidation yields and the *cis*- to *trans*-stilbene oxide ratio and in the generation and stabilization of the  $[\text{Mn}(\text{por})(\text{O})(\text{im})]^+$  species.



**D. Mohajer,\* M. Abbasi** ..... 3218–3224

Solvent Effects on Catalytic Epoxidation of Alkenes by Tetra-*n*-butylammonium Periodate and (Tetraarylporphyrinato)manganese(III)

**Keywords:** Manganese / Porphyrinoids / Homogeneous catalysis / Epoxidation / Solvent effects / Oxidation

\* Author to whom correspondence should be addressed.

 Supporting information on the WWW (see article for access details).

If not otherwise indicated in the article, papers in issue 19 were published online on June 18, 2008