

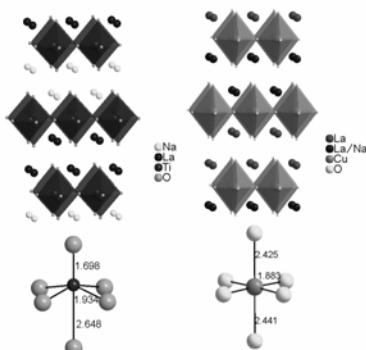
Journal of Chemical Sciences

[Formerly: Proceedings (Chemical Sciences)]

Vol. 121, No. 3, May 2009

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Perspective Article

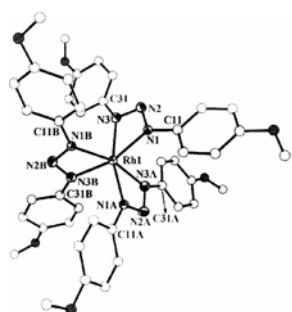


Quest for new materials: Inorganic chemistry plays a crucial role

J Gopalakrishnan and Rohini Mani 235–256

Chemistry – inorganic chemistry in particular – plays a crucial role in the endless quest for new materials to meet the demands of advancing technology. We show in this article how some of the fundamental concepts of inorganic chemistry such as acidity/basicity, oxidation/reduction, crystal field theory, mixed valence and electron transfer, Jahn-Teller distortion and so on find application in this quest.

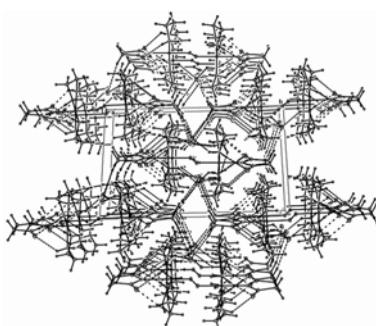
Full Papers



Tris-(1,3-diaryltriazenide) complexes of rhodium – Synthesis, structure and, spectral and electrochemical properties

Chhandasi GuhaRoy, Michael G B Drew and Samaresh Bhattacharya 257–266

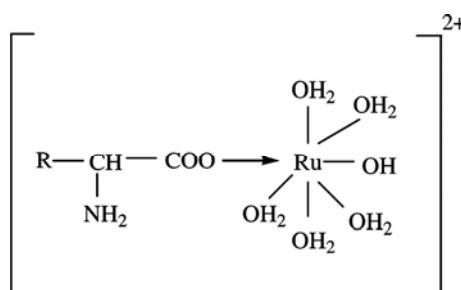
Reaction of 1,3-diaryltriazenes (**1**, HL-R) with $[\text{Rh}(\text{PPh}_3)_2(\text{CO})\text{Cl}]$ in ethanol in the presence of NEt_3 produces *tris*-diaryltriazenide complexes of type $[\text{Rh}(\text{L}-\text{R})_3]$. Structure of the $[\text{Rh}(\text{L}-\text{OCH}_3)_3]$ complex has been determined by X-ray crystallography. The complexes show intense MLCT transitions in the visible region and also fluoresce at ambient temperature.



Synthesis and structural characterization of a novel peroxy bridged dinuclear cobalt(III) complex of succinimide showing three varieties of hydrogen bonding interactions

Murat Taş and Orhan Büyükgüngör 267–273

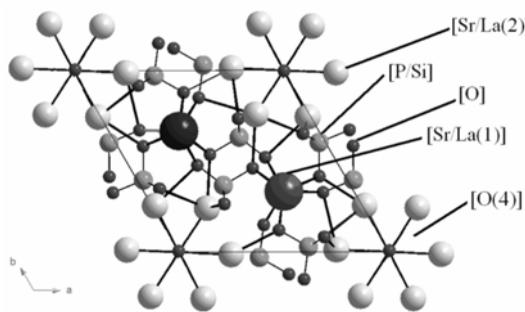
In the centrosymmetric peroxy bridged dinuclear Co(III) compound $[\text{Co}(\text{en})_2(\text{suc})(\mu-\text{O}_2)\text{Co}(\text{en})_2(\text{suc})](\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}$, **1** (en = ethylenediamine; such = succinimide), the cobalt atom exhibits a distorted octahedral geometry. A linear peroxide bridge is observed in **1** due to steric hindrance. The complex cation, nitrate anion and lattice water are involved in three varieties of H-bonding interactions.



Mechanistic study of ruthenium (III) catalysed oxidation of L-lysine by diperiodatoargentate (III) in aqueous alkaline medium

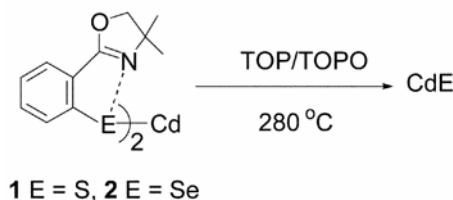
R R Hosamani and S T Nandibewoor 275–281

The kinetics of oxidation of ruthenium (III) catalysed oxidation of L-lysine by diperiodatoargentate(III) (DPA) in aqueous alkaline medium has been studied. The active species of DPA is found to be $[\text{Ag}(\text{H}_2\text{IO}_6)(\text{H}_2\text{O})_2]$ and that of ruthenium (III) to be $[\text{Ru}(\text{H}_2\text{O})_5\text{OH}]^{2+}$ in alkaline medium.


Structural and spectroscopic investigation of lanthanum-substituted strontium-oxybritholites

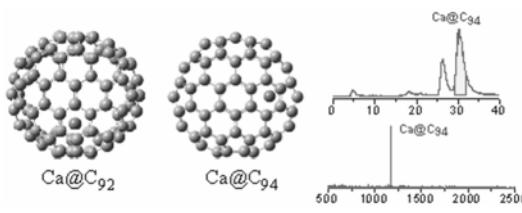
K Boughzala, S Nasr, E Ben Salem, F Kooli and K Bouzouita **283–291**

The refinement of powder XRD patterns of the lanthanum-substituted strontium-oxybritholites by the Rietveld method, showed that the lanthanum occupied preferentially the (6h) sites, i.e. M(2) sites into the apatite structure. After inserting La^{3+} and SiO_4^{4-} into the oxyapatite framework, the oxygen O(4) shifted regularly towards the centre of the triangle formed by M(2)-atoms.


Synthesis and characterization of CdS and CdSe nanoparticles prepared from novel intramolecularly stabilized single-source precursors

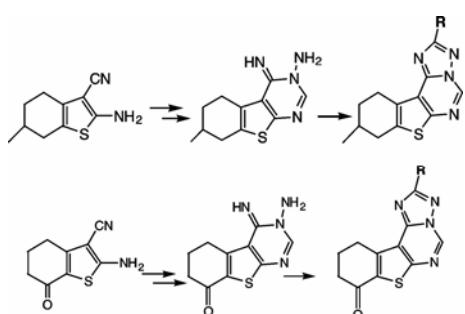
Karuppasamy Kandasamy, Harkesh B Singh and Shailendra K Kulshreshtha **293–296**

Synthesis and characterization of cadmium sulphide and selenide nanoparticles from the corresponding novel intramolecularly stabilized cadmium chalcogenolates incorporating 2-(4,4-dimethyl-2-oxazolinyl)benzene is reported.


Isolation and characterization of higher metallofullerenes Ca@C₉₂ and Ca@C₉₄

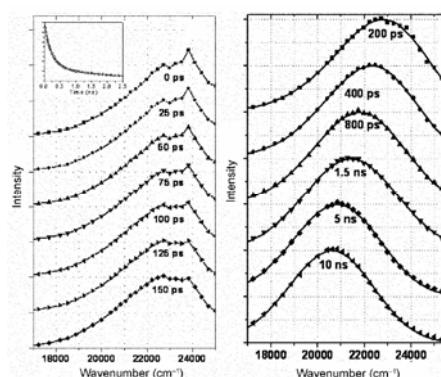
Yuliang Che, Hua Yang, Hongxiao Jin, Chunxin Lu and Ziyang Liu **297–300**

Ca-containing metallofullerenes Ca@C₉₂ and Ca@C₉₄ are synthesized from direct current arc discharge method and isolated by multi-stage high-performance liquid chromatography technique without recycling equipment.


Synthesis and antimicrobial activity of some novel thienopyrimidines and triazolothienopyrimidines

Nitinkumar S Shetty, Ravi S Lamani and Imtiyaz Ahmed M Khazi **301–307**

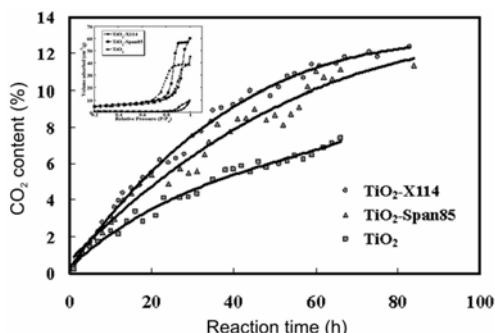
Novel tricyclic thienopyrimidines and triazole fused tetracyclic thienopyrimidines were synthesized from precursors 2-amino-6-methyl-4,5,6,7-tetrahydro-1-benzothiophene-3-carbonitrile and 2-amino-7-oxo-4,5,6,7-tetrahydro-1-benzothiophene-3-carbonitrile respectively. The corresponding precursors were prepared by employing the Gewald reaction. All the compounds have displayed promising antibacterial and antifungal activities.



Excited state dynamics of 9,9'-bianthryl in room temperature ionic liquids as revealed by picosecond time-resolved fluorescence study

Dinesh Chandra Khara, Aniruddha Paul, Kotni Santhosh and Anunay Samanta 309–315

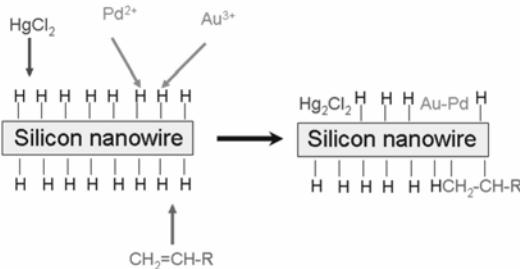
Early-time fluorescence spectra of 9,9'-bianthryl in ionic liquids show that the locally excited (LE) to charge transfer (CT) state relaxation times of the molecule vary between 230 and 390 ps. The results confirm that while in conventional less viscous solvents CT formation kinetics of bianthryl occurs simultaneously with the solvation dynamics, the two processes mostly occur in different time scales in ionic liquids.



The study of the relationship between pore structure and photocatalysis of mesoporous TiO₂

Bing Guo, Hangyan Shen, Kangying Shu, Yaowu Zeng and Wensheng Ning 317–321

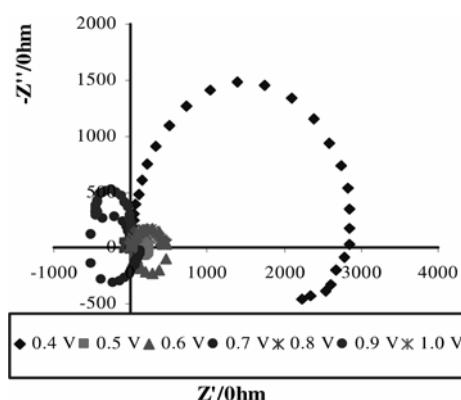
Mesoporous titania was synthesized by a sol-gel method. Two kinds of channels, straight channels made of cylindrical capillaries and curved channels made of slit-shaped pores, exist in the bulk materials. The sample with higher porosity, better textural properties and straight channels are good for photocatalytic performance.



Surface functionalization of HF-treated silicon nanowires

Ming-Wang Shao, Hong Wang, Yan Fu, Jun Hua and Dorothy-Duo-Duo Ma 323–327

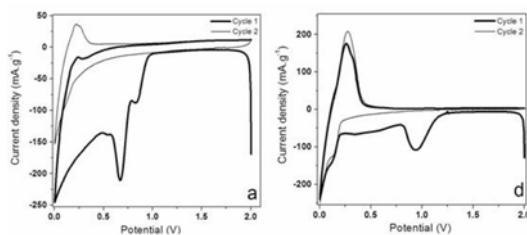
Functionylation of hydrogen-terminated surface of silicon nanowires was conducted, which included coupling reaction with acrylate, reductive deposition with HgCl₂, and co-reduction of AuCl₃ and PdCl₂.



Temperature dependence studies on the electro-oxidation of aliphatic alcohols with modified platinum electrodes

Panadda Katikawong, Tanakorn Ratana and Waret Veerasai 329–337

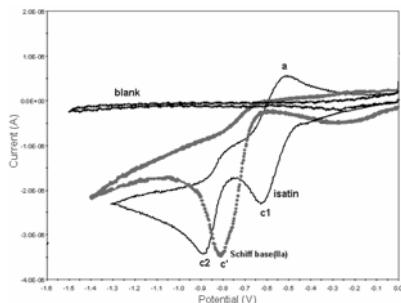
We present here the temperature dependence on the electro-oxidation of aliphatic alcohols including; methanol, ethanol, 1-propanol on the well-defined Pt-based electrodes. Cyclic voltammetry (CV) was used to provide kinetic data while electrochemical impedance spectroscopy (EIS) was used to distinguish different elementary steps of the reaction process at desired bias potentials.



Electrochemical cell studies on fluorinated natural graphite in propylene carbonate electrolyte with difluoromethyl acetate (MFA) additive for low temperature lithium battery application

R Chandrasekaran, M Koh, Y Ozawa, H Aoyoma and T Nakajima 339–346

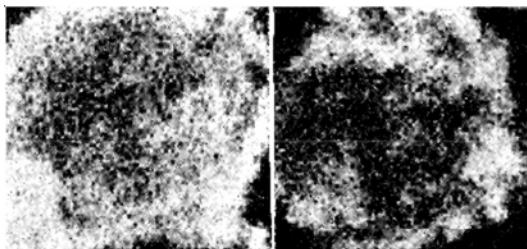
The electrochemical performances of fluorinated natural graphite were examined in an organic media with and without 0.15 v% of fluoroester-difluoromethyl acetate (MFA) by cyclicvoltammetry, impedance spectroscopy and galvanostatic charge-discharge studies which shows the applicability of MFA as additive for low temperature Li-battery applications.



A comparative study of electrochemical reduction of isatin and its synthesized Schiff bases at HMDE

Alpana K Gupta and Rajendra S Sindal 347–351

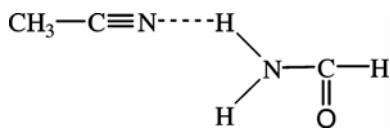
Electrochemical behaviour of a series of Schiff base i.e. 3-[5-phenylpyrazol-3-ylimino] indol-2-ones (IIa-e) of 5-substituted isatins with 3-amino-5-phenyl-pyrazole has been investigated and compared with corresponding isatin by using cyclic voltammetry at a Hanging Mercury Drop Electrode.



Surface reactivity and layer analysis of chemisorbed reaction films in the surface-chemical environment of alkyl octadecenoates

R B Choudhary, O N Anand and O S Tyagi 353–360

Chemisorbed reaction films were generated in order to investigate the chemical nature of the surface films and the chemical constitution thereof. Its stability in the thermal environment was also studied. The sub-layer analysis of these films showed enhanced reactivity of the alkyl octadecenoates of varying chemical origin.

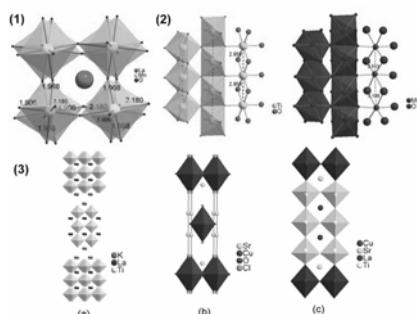


Application of the Kirkwood–Buff theory of solutions to acetonitrile + amide binary mixtures by using inversion procedure and regular solution theory

Anil Kumar Nain 361–367

The Kirkwood–Buff integrals for binary mixtures of acetonitrile with some amides at 298.15 K have been calculated from ultrasonic speed and density data by using the inversion procedure and regular solution theory. The results indicate that acetonitrile-amide interaction follows the order: FA > NMA > DMA > DMF.

Errata 369



Cover picture: A selection of inorganic crystal structures that formed the basis for the discovery of new materials/phenomena: (1) LaMnO₃ – orbital ordering and colossal magnetoresistance. (2) Rutile oxides – photocatalysis, incipient ferroelectricity, metal–metal bonding, metal–insulator transition, half-metallic ferromagnetism. (3) Metathesis reaction between K₂La₂Ti₃O₁₀ (a) and Sr₂CuO₂Cl₂ (b), yielding a new copper titanate, Sr₂La₂CuTi₃O₁₂ (c). For details see the paper by J Gopalakrishnan and Rohini Mani (pp 235–256).