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INTERNATIONAL CONFERENCE “ACHIEVEMENTS AND PERSPECTIVES OF MODERN CHEMISTRY”, 09-11 October 2019, Chisinau, Republic of Moldova

EDITORIAL

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THE INSTITUTE OF CHEMISTRY AT 60 YEARS ANNIVERSARY. BRIEF HISTORY, ACHIEVEMENTS AND PERSPECTIVES

Aculina Aricu, Raisa Nastas, Maria Cocu

INVITED PAPER

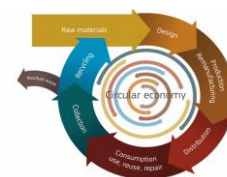
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TREATMENT OF SECONDARY RAW MATERIALS BY INNOVATIVE PROCESSES

Stefano Ubaldini, Daniela Guglietta, Francesca Trapasso, Serena Carloni, Daniele Passeri, Adalgisa Scotti

This paper presents an overview of the various innovative methodologies used in the recovery of valuable metals and critical raw materials from secondary sources. The review also highlights the used varieties of application on large scale in real situations and hopes to provide insights into valorization of spent sources.



RESEARCH PAPER

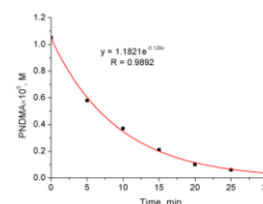
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SELF-PURIFICATION OF AQUATIC MEDIA FROM HEXACHLOROCYCLOHEXANE IN A RADICAL PROCESS

Serghei Travin, Gheorghe Duca, Viorica Gladchi

The influence of hexachlorocyclohexane (HCH) on the processes of radical self-purification of water bodies was studied. It was found, that HCH plays a dual role for aquatic ecosystems – it is not only a scavenger of free radicals, but also an additional initiator. Under the influence of light in the surface layer of water, HCH generates radicals, thus contributing to the self-purification processes.



RESEARCH PAPER

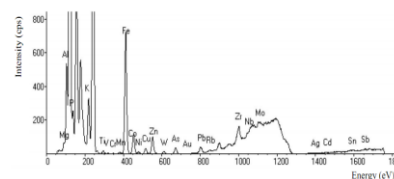
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ASSESSMENT AND MODELING OF HEAVY METAL POLLUTION OF SOIL WITHIN RECLAIMED AUTO REPAIR WORKSHOPS IN ORJI, IMO STATE NIGERIA

Chidi Edbert Duru

Toxic heavy metals within a reclaimed section of the Orji mechanic village in Nigeria were determined using X-ray fluorescence and atomic adsorption spectrophotometric methods. The data were analyzed using geo-statistical techniques. Results showed that the soil was strongly contaminated by lead, and extremely contaminated by cadmium at some of the sampling points. The activities at the mechanic village in this area significantly affected the accumulation of these heavy metals and immediate soil remediation has been recommended.



RESEARCH PAPER

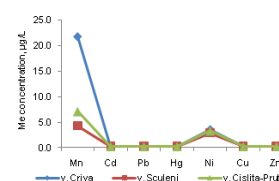
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DETERMINATION OF QUALITY INDICATORS OF PRUT RIVER WATER

Gheorghe Duca, Aliona Mereuta, Natalia Velisco, Claudiu Tanaselia, Tatiana Mitina

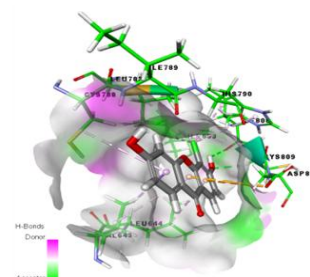
This study presents an assessment of water quality of Prut River using the Water Quality Index (WQI), calculated according to the weighted arithmetic water quality index method. The obtained results show that the water of Prut River may be classified according to WQI as good water quality of grade B for sampling points Sculeni and Cislita-Prut villages, and very poor water quality of grade D collected in the sampling point Criva village.



SYNTHESIS, CHARACTERIZATION AND MOLECULAR DOCKING OF CHLORO-SUBSTITUTED HYDROXYXANTHONE DERIVATIVES

Emmy Yuanita, Harno Dwi Pranowo, Mustofa Mustofa, Respati Tri Swasono, Jufriyal Syahri, Jumina Jumina

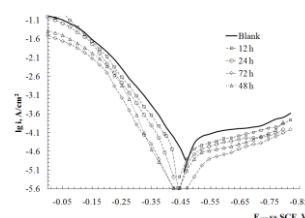
In this study, the chloro-substituted hydroxyxanthenes were prepared by cyclodehydration of acid derivatives and substituted phenol in the presence of Eaton reagent, followed by halogenations step to electrophilic substitution of chlorine in a moderate yield. The *in vitro* anticancer activity study on various cell lines revealed that the chloro functional group increases the anticancer activity of the hydroxyxanthone derivatives. The molecular docking study showed that there was a binding interaction between chloro-hydroxyxanthone and the amino acid residues such as Asp810, Cys809, Ile789, His790, and Leu644 of protein tyrosine kinase receptor.



APRICOT CAKE EXTRACT AS CORROSION INHIBITOR OF STEEL: CHEMICAL COMPOSITION AND ANTI-CORROSION PROPERTIES

Viktoria Vorobyova, Margarita Skiba

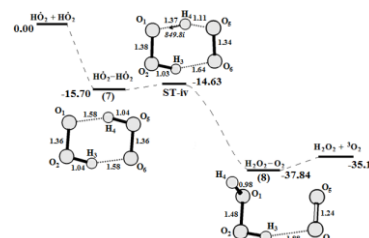
The protection performance of self-assembled layers (SALs) formed by apricot cake extract (ACE) on the surface of steel has been studied. It was revealed that the protection ability of the SALs is determined by the time of film formation on the steel surface. The maximal corrosion inhibition efficiency (about 93%) was obtained after 48 h process of film formation in the vapour phase of the apricot cake extract. The results of the electrochemical analysis revealed that the ACE modified steel showed better corrosion protection in conditions of periodic condensation of moisture.



DFT STUDY OF THE ENTIRE REACTION CYCLE OF H₂O₂ DECOMPOSITION AND O₂ GENERATION CATALYZED BY FENTON REAGENT

Ion Arsene, Natalia Gorinchiy

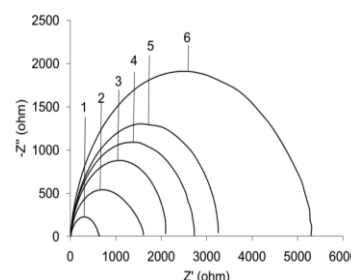
The reaction cycle of H₂O₂ decomposition and O₂ generation catalyzed by Fenton reagent was studied using density functional theory calculations. A four-stage mechanism for the oxygen production and the Fe²⁺ regeneration in the Fenton reaction is proposed based on the obtained results. It is shown that the O-O bond cleavage of coordinated H₂O₂ at the first step of reaction does not lead to a free HO• radical. Instead, a highly reactive intermediate [Fe^{IV}(H₂O)₄(OH)₂]²⁺ with two HO• radicals “trapped” in the complex is formed. The result of the next two reaction steps is the formation of the two HO₂• radicals which can react on the triplet energy surface in order to produce O₂ and a H₂O₂.



ELECTROCHEMICAL STUDIES OF THIOSEMICARBAZONE DERIVATIVE AND ITS TIN(IV) COMPLEX AS CORROSION INHIBITOR FOR MILD STEEL IN 1 M HYDROCHLORIC ACID

Nur Nadira Hazani, Yusairie Mohd, Sheikh Ahmad Izaddin Sheikh Mohd Ghazali, Nur Nadia Dzulkifli

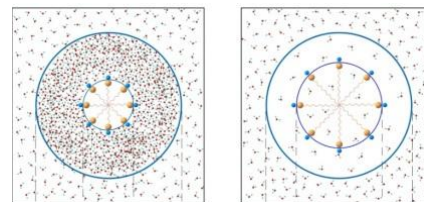
The inhibitive effects of 2-acetylpyridine-4-ethyl-3-thiosemicarbazone (HAcETSc) and dichlorophenyltin(IV) 2-acetylpyridine-4-ethyl-3-thiosemicarbazone (Sn(HAcETSc)PhenCl₂) for mild steel in 1 M HCl solution at different concentrations were investigated using electrochemical measurements and scanning electron microscopy analysis. The result of electrochemical measurement found that the inhibition efficiency increased with inhibitors' concentration. Moreover, it was shown that Sn(HAcETSc)PhenCl₂ had a better inhibitive effect than HAcETSc.



**STRUCTURE OF MICELLES OF SODIUM DODECYL SULPHATE IN WATER:
AN X-RAY AND DYNAMIC LIGHT SCATTERING STUDY**

Yuri Mirgorod, Alexander Chekadanov, Tatiana Dolenko

Aqueous micellar solutions of sodium dodecyl sulphate were investigated using X-ray scattering technique by a model-independent approach and dynamic light scattering in the concentration range 0.008–0.1 M. The obtained results are discussed in the framework of the concept of polyamorphous transition between ensembles of water clusters of low and high density levels. Polyamorphous transition accompanies the formation of dual structures of contact and separated by water micelles with different rates of diffusion.



**NOVEL IRON(II) AND COPPER(II) POLYMERIC COORDINATION COMPOUNDS WITH
N,N'-BIPYRIDINE-TYPE LIGANDS: SYNTHESIS AND CHARACTERIZATION**

Aliona Vitu

Two new 1D coordination polymers based on octahedral Fe(II) and square-pyramidal Cu(II) complexes and *N,N'*-bipyridine-type ligands were synthesized by slow evaporation method. The compounds with the formula $\{(\text{bpyH}_2) \cdot [\text{Fe}(\text{bpy})_2(\text{H}_2\text{O})_2(\text{SO}_4)_2] \cdot 2(\text{H}_2\text{O})\}_n$ and $\{[\text{Cu}(\text{bpp})_2(\text{H}_2\text{O})] \cdot (\text{BF}_4)_2 \cdot \text{dmf} \cdot 0.75(\text{H}_2\text{O})\}_n$, (where bpy= 4,4'-bipyridine and bpp= 1,3-bis(4-pyridyl)propane, dmf= *N,N*-dimethylformamide) were characterized by thermal analysis, FT-IR spectroscopy and single crystal X-ray diffraction method.

