

ISSUE CONTENTS LIST WITH GRAPHICAL ABSTRACTS

NEWS AND EVENTS

7

PAST CONFERENCE REPORT

INVITED PAPER

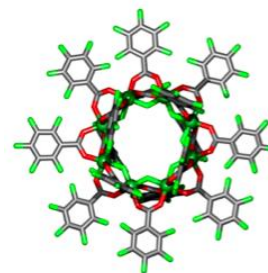
INORGANIC AND COORDINATION CHEMISTRY

9

NEW HOMOMETALLIC OCTANUCLEAR CHROMIUM(III) RINGS

Grigore Timco, Robin Pritchard, George Whitehead, Richard Winpenny

Four new $\{Cr_8\}$ rings have been synthesized and characterized; they are all based on the classic $[CrF(O_2CtBu)_2]_8$ ring **1**. Three routes have been studied. The first is direct synthesis, by reacting hydrated chromium(III) fluorides with the acid; this has been used to produce $[CrF(O_2CEt)_2]_8$ **3**. The second route uses **3** as a precursor and substitute with an incoming carboxylate. This has been used to make $[CrF(O_2CCl_3)_2]_8$ **4** and $[CrF(O_2CC_6F_5)_2]_8$ **5**. The third route uses *N*-ethyl-*D*-glucamine (H_5Etglu) as a template and produces chiral rings $[Cr_8F_4(Etglu)(O_2CtBu)_{15}]$ **6**. The single crystal X-ray structures of these new compounds are reported.



RESEARCH PAPER

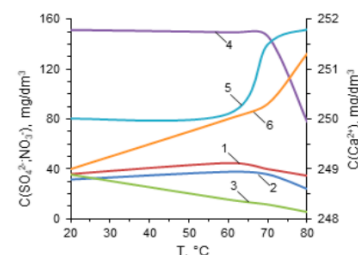
ECOLOGICAL CHEMISTRY

18

OBTAINING OF COMPLEX MINERAL FERTILIZER BY PHOSPHOGYPSUM CONVERSION WITH AMMONIUM NITRATE

Anna Ivanchenko, Dmytro Yelatontsev, Anatoliy Savenkov, Olena Nazarenko, Viktoria Kundirenko

An environmentally friendly method for phosphogypsum processing into N,Ca,S,P-fertilizers is proposed. Thus, was obtained a complex liquid N,Ca,S,P-fertilizer with the content of nutrients (wt. %) N:Ca:S:P=56:26:12:6 in the dry product, and 16.8:3.6:7.8:1.8 in the liquid phase. The obtained fertilizer increased the yield of radish by 7.16% compared to the control. The advantage of the proposed method is reducing the cost of the fertilizer, increasing its nutritional value, and obtaining useful products from the waste.



RESEARCH PAPER

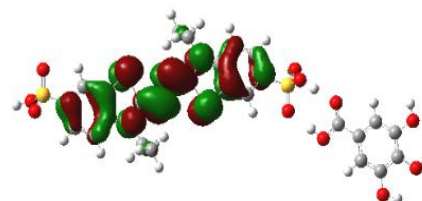
PHYSICAL CHEMISTRY AND CHEMICAL PHYSICS

24

SOME PARTICULARITIES OF THE REACTION BETWEEN ANTIOXIDANT PHENOLIC ACIDS AND THE FREE RADICAL ABTS^{•+}: A COMPARATIVE DFT STUDY FOR THE GAS PHASE AND ETHANOL

Mikhail Gorbachev, Natalia Gorinchoy, Iolanta Balan

The detailed mechanism of the interaction of the radical cation $ABTS^{\bullet+}$ with a number of food acids (gallic, ferulic, caffeic, vanillic, cinnamic, syringic, *p*-coumaric) is revealed by means of the DFT calculations. It is shown that the interaction between the neutral molecules of the studied food acids and $ABTS^{\bullet+}$ does not lead to any charge transfer from these molecules onto $ABTS^{\bullet+}$. The almost complete conversion of the $ABTS$ radical cation into its diamagnetic derivative occurs due to the interaction of one of the sulphonic groups of $ABTS^{\bullet+}$ with the acid anions through the formation of the corresponding intermolecular hydrogen bond.



RESEARCH PAPER

PHYSICAL CHEMISTRY AND CHEMICAL PHYSICS

31

A NEW MODEL OF CHEMICAL DISSOLUTION OF SOLIDS: AN ANALYSIS OF THE MECHANISM OF DISSOLUTION OF MONODISPERSED MATERIALS

Alma Ryskaliyeva, Murat Baltabayev, Yerassyl Mukhamediyar, Rabiga Iskendirowa

Based on a new model of chemical dissolution, an analysis of the kinetic parameters obtained using the modified Dolivo-Dobrovolsky equation was carried out. It shows that the change in parameters during the transition from one mineral to another is subject to a compensation effect. Additionally, calculations allowed distinguishing between the systemic and individual properties of minerals of the same nature in the process of dissolution. These minerals differ from each other by the concentration of active surface complexes, and are combined into a system by a single transmission coefficient and the same value of the lifetime of the active complex.

$$U = k \cdot \frac{S_0 \cdot C_0^\alpha}{\sigma} \cdot t$$

RESEARCH PAPER

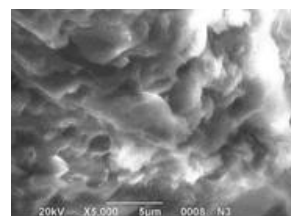
PHYSICAL CHEMISTRY AND CHEMICAL PHYSICS

37

THE EFFECT OF HALIDE IONS ON THE ACTIVITY OF d-METAL COMPLEXES SUPPORTED ON NATURAL BENTONITE IN THE REACTION OF LOW TEMPERATURE OZONE DECOMPOSITION

Tatyana Rakitskaya, Alla Truba, Ganna Dzhyga

The effect of halide ions ($X = Cl^-$, Br^- , I^-) on the kinetics of ozone decomposition by compositions supported on the natural bentonite of the Dashukovske deposit in Ukraine (N-Bent(D)) has been studied. The obtained results have shown that the activity of the $KX/N-Bent(D)$ composition in the ozone decomposition reaction increases in the row $KCl \ll KBr < KI$, which correlates with an increase in their reducing properties (the redox potential of the $X_2/2X^-$ pair decreases). Such catalyst compositions can be recommended for applying in personal protective equipment for the respiratory system.



RESEARCH PAPER

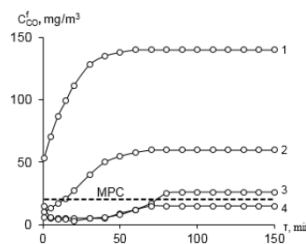
PHYSICAL CHEMISTRY AND CHEMICAL PHYSICS

47

INFLUENCE OF ACID MODIFICATION OF NATURAL PHLOGOPITE ON CATALYTIC ACTIVITY OF SUPPORTED Pd(II)-Cu(II) COMPLEXES IN THE REACTION OF OXIDATION OF CARBON MONOXIDE BY ATMOSPHERIC OXYGEN

Anna Nazar, Tatyana Rakitskaya, Tatyana Kiose

The paper presents original results on the effect of nitric acid concentrations on structure, morphology, protolytic properties and the activity of low-temperature carbon monoxide oxidation catalysts based on acid-modified phlogopite (H-Phl-1) and K_2PdCl_4 , $Cu(NO_3)_2$, KBr base components. The obtained samples were characterized by XRD, SEM, FT-IR spectroscopy and pH metric method. The obtained catalyst Pd(II)-Cu(II)/8H-Phl-1 can be recommended for use in respiratory devices.



RESEARCH PAPER

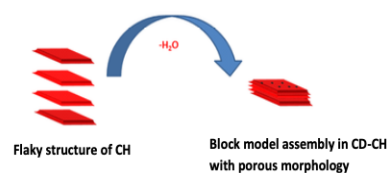
ORGANIC CHEMISTRY

56

ONE-POT AND SOLVENT-FREE SYNTHESIS OF CARBODIIMIDE MODIFIED CHITOSAN; EXTRAORDINARY THERMALLY STABILITY

Silvadas Jesna Das, Mohan Sidharth, Chandroth Kalyad Simi

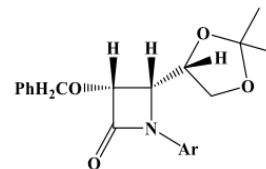
A facile, one-pot, and solvent-free synthesis was developed to obtain a thermally stable chitosan biopolymer. The bifunctional isocyanate by interaction with chitosan formed urea and urethane bonds between chitosan chains. Subsequently, the designed chemistry facilitated the formation of carbodiimide bonds between chitosan chains via dehydration of the urea bond. The modified chitosan was proved to be superior in thermal properties and could be used as a thermally stable bio-filler



MICROWAVE-INDUCED CONVERSION OF ELECTROMAGNETIC ENERGY INTO HEAT ENERGY IN DIFFERENT SOLVENTS: SYNTHESIS OF β -LACTAMS

Aparna Das, Ram Naresh Yadav, Bimal Krishna Banik

In this work, the stereospecific synthesis of optically active cis β -lactams under diverse microwave-induced conditions using diverse solvents was reported. The effects of low $\tan\delta$ values of the solvents are found to be more crucial than solvents with high dipole moments and dielectric constants. The results indicated that for the synthesis of β -lactams solvents with low $\tan\delta$ and high dipole moment and high dielectric constant are necessary. Best of the knowledge this is the first report that examined the importance of $\tan\delta$ values of the solvents in β -lactams synthesis.



INSTRUCTIONS FOR AUTHORS