Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION X
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 26-27. September 2022.

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P12

Possibility of using other additives as replacement for air entraining admixture in concrete

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Concrete in which the air entraining admixture was used can exhibit behavior which alternate from the 'standard' concrete behavior when employed in the structural design. The origin of this problem can be found in the changeable properties of the componential materials, incompatibility of the utilized raw materials, influence of extreme conditions on the concrete curing (i.e., increased temperature), etc. The possibility of using other additives for the concrete exposed to various environmental influences was investigated. Sustainability of concrete production and resource efficiency urged the searching for an adequate waste material or an industrial byproduct which would improve freezing/thawing resistance of concrete. In this paper the possibility of Sika Aer Solid powdery additive and recycled rubber as a substitute for the air entraining admixture was investigated. Four mixtures were designed: referent concrete with no air entraining admixtures, concrete with Sika Aer Solid, concrete with recycled rubber, and concrete with air entraining admixture. The properties of fresh and hardened concrete were examined. The obtained results of compressive strength, resistance to freezing/thawing cycles and depth of water penetration under pressure for altered concretes indicate that it is possible to use alternative additives as substitutes for air entraining admixture.

P13

Adsorption of anthraquinone dye acid violet 09 from aqueous solution using synthesized alumina-iron oxide doped particles

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One of the promising methods for wastewater treatment is adsorption. This study investigated the adsorption of anthraquinone dye Acid violet 109 from water solution using the alumina-iron oxide doped particles prepared by sol-gel method and sintered at 800 °C. The adsorbent

morphology and distribution of diameter of the particles were revealed by Scanning Electron Microscopy and Energy Dispersive Spectroscopy. In the second part, the effect of initial dye's and adsorbent's concentrations and pH value on dye adsorption was studied. Also, the kinetic study of dye adsorption covers the pseudo-second-order and intra-particle diffusion. The change of AV 109 concentration during the adsorption was followed using the UV-Visible spectrophotometer. The adsorption kinetics is in accordance with the pseudo-second-order kinetics model. After 60 minutes of treatment, at the initial dye's concentration of treatment, at the initial dye's concentration of 50 mg dm^{-3} using the alumina-iron doped particles adsorption efficiency was 51.3% and the value of adsorption capacity is 2.64 mg g^{-1}. The adsorption rate was 0.122 g mg^{-1} min^{-1}.

P14

The behavior of cerium doped phosphate tungsten bronze in Briggs-Rauscher oscillatory reaction

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The Briggs-Rauscher (BR) reaction is an oscillating reaction in which the oxidation of malonic acid ($CH_2(COOH)_2$) in the presence of hydrogen peroxide (H_2O_2) and potassium iodate (KIO_3) is catalyzed with a metal ion (usually Mn^{2+}) in acidic aqueous solution. The BR reaction is very sensitive to the addition of different types of analytes. Every change in oscillatory dynamics, caused by analyte addition, can be used for the appraisal of analyte concentration, as well as its potential antiradical or catalytic activity.
The cerium doped phosphate tungsten bronze (Ce-PWB) was obtained by thermal treatment and characterized by TGA, DSC, FTIR, and XRPD technics. In this work, the behavior of Ce-PWB and its influence on BR oscillatory dynamics was examined. Different masses of Ce-PWB (0.0303 g; 0.0400 g; 0.0704 g; 0.1045 g) were added to the BR reaction solution consisting of: $[CH_2(COOH)_2]_0$=0.0789 mol dm^{-3}, $[MnSO_4]_0$=0.00752 mol dm^{-3}, $[HClO_4]_0$=0.03 mol dm^{-3}, $[KIO_3]_0$=0.0752 mol dm^{-3}, and $[H_2O_2]$=1.2 mol dm^{-3} in total volume of 25 ml. The obtained results were compared with the basic BR oscillogram (oscillogram obtained without the addition of Ce-PWB). The results revealed that an increase in the mass of added Ce-PWB has slightly shortened the oscillation time duration with the minimal change in the form of the basic BR oscillogram, suggesting the catalytic effect of this bronze in oscillatory reaction.
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