



Society of Physical Chemists of Serbia

PHYSICAL CHEMISTRY 2021

*15th International Conference on
Fundamental and Applied Aspects of
Physical Chemistry*

PC2021

The Conference is dedicated to the

30th Anniversary of the founding of the Society of Physical Chemists of Serbia

and

100th Anniversary of Bray-Liebhafsky reaction



PHYSICAL CHEMISTRY 2021

15th International Conference on Fundamental and Applied Aspects of Physical Chemistry

Organized by

The Society of Physical Chemists of Serbia (SPCS)



in co-operation with

Institute of Catalysis, Bulgarian Academy of Sciences



Boreskov Institute of Catalysis, Siberian Branch of Russian Academy of Sciences



and

Members of the University of Belgrade:



Faculty of Physical Chemistry



Institute of Chemistry, Technology and Metallurgy



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buffer at pH 7. Compared with KR which has no affinity to adsorb IBU, modification of KR with H improved adsorption of this drug. Results showed that adsorption of IBU increased with increasing of the amount of surfactant in organokaolins as well as with increasing of the initial concentration of the drug in solution. Adsorption of IBU by both adsorbents followed nonlinear isotherms and from the Langmuir model, the maximum adsorption capacities were 2.05 mg/g for HKR-50 and 3.12 mg/g for HKR-90.

K-03-P

SOLID-PHASE EXTRACTION OF ESTROGEN HORMONES FROM WATER USING MULTI-WALLED CARBON NANOTUBES AS SORBENT

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Multi-walled carbon nanotubes were employed as a sorbent for solid-phase extraction of estrogen hormones (estrone, 17 β -estradiol, and 17 α -ethinylestradiol) from water solution. The solid-phase extraction (SPE) method was optimized by choosing an appropriate mass of the sorbent, volume, and initial pH of hormone water solution, as well as by choosing an appropriate organic solvent for extraction. Based on the obtained hormone recoveries, the following SPE conditions were chosen as optimal: 100 cm³ of hormone water solution at initial pH adjusted to 10; 20 mg of the sorbent; and methanol-dichloromethane mixture as elution solvent. Recoveries obtained under the optimal conditions ranged from 70.56 % for estrone, to 81.23 % for 17 α -ethinylestradiol, with a relative standard deviation from 9.92 to 18.74 %.

K-04-P

ENVIRONMENTAL RISK OF HEAVY METAL CONTAMINATION IN URBAN SEDIMENTS: A STUDY IN THE CITY OF BELGRADE, SERBIA

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Concentrations of 10 potentially toxic trace elements were measured in soil samples collected from 18 sites in urban areas of Belgrade, the capital and the largest city in Serbia. Samples were analysed in order to assess the extent of soil contamination and to distinguish natural and anthropogenic input. The results demonstrated a general Zn, Pb, and Cd enrichment in surface samples, hence, after comparison with guidelines, it has been determined that there is a potential risk for human health. In

the surface and buried samples, traces of copper were detected. The highest concentrations of Cr ($121 \pm 12.3 \text{ mg/kg}$) and Ni ($94.9 \pm 12.6 \text{ mg/kg}$) were found at a sediment depth of 2m and should be ascribed to geogenic sources. The results of HCA and PCA analysis supported a natural origin of Co, Cu, Mn, Cr, and Ni, while Cd, Zn, and Pb originated from anthropogenic inputs.

K-05-P

POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) IN TWO HYDROGEOCHEMICAL DIFFERENT SEDIMENTARY ENVIRONMENTS OF THE TERTIARY KREPOLJIN BROWN COAL BASIN, SERBIA

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The sediments of the coal-bearing series of the Tertiary Krepoljin Brown Coal Basin have been investigated and presented in this manuscript. The samples of the intercalated mixed sediments (pieces of coal in clays, sandstones and shales) originate from two hydrogeochemically differing sedimentary environments: the illitemontmorillonitic (IM), and the calcitic (Ct) environment. The abundances of 16 polycyclic aromatic hydrocarbons (PAHs) on the priority list of the United States Environmental Protection Agency (U.S. EPA) have been determined in 10 analyzed sediment samples. The concentrations of Σ PAHs in sediments ranged from 449 to 10585 $\mu\text{g/L}$. A total of 8 of 16 PAHs, including B[a]A, Chry, B[b]F, B[k]F, B[a]P, IP, DB[a,h]A, and B[g,h,i]P, are regarded as potentially carcinogenic, indicating a higher possibility of occurrence of adverse ecological effect. High molecular-weight (HMW) PAHs are predominant in all sediments, but carcinogenic PAHs are predominant in sediments of Ct environment ($550 \mu\text{g/L}^{-1}$). Freshwater sediments show a lower sulfur content ($\Sigma 346 \pm 19.9 \mu\text{M/g}$ for IM samples, and $402 \pm 56.28 \mu\text{M/g}$ for Ct samples), with organic sulfur dominating. The molar ratio of H/C play a role in the changing process in the total PAHs, followed by the molar ratio of O/C and carbon content. Non-existence of the correlation between N/C ratio and other parameters indicates unspecific changes which accompany original terrestrial organic matter.