RUSSIAN ACADEMY OF SCIENCES

A.N.FRUMKIN INSTITUTE OF PHYSICAL CHEMISTRY AND ELECTROCHEMISTRY

XVth INTERNATIONAL CONFERENCE

SURFACE FORCES

May 12-16, 2014,
Verbilki, Moscow region

Conference Programme and Book of Abstracts

POSTER SESSION,
Wednesday, May 14, 17:00 – 19:00

Please note that all the authors presenting their posters will be given a possibility to make a brief announcement (2-3 minutes with 1-2 PowerPoint slides) about main findings of their posters, at the end of oral sessions on Tuesday May 13.

P1. **Electrostatic field and structure of lipid bilayer interface modified by polylysines**
N. I. Marukovich, O. V.Batishchev, A.Nesterenko, Y. A. Ermakov (Russia)

P2. **The cluster formation study on the various type surfaces under SALDI mass-spectrometry conditions**
I.S. Goncharova, A. K. Buryak (Russia)

P3. **Morphology and anticorrosion properties of the superhydrophobic coatings on aluminum alloy**
S.V.Gnedenkov, S.L.Sinebryukhov, V.S. Egorkin, Vyaliy I.E., Gavrilov A.I., Emelyanenko A.M., Boinovich L.B. (Russia)

P4. **Viscosity of liquids at small gradients of flow velocity**
D.Makarova, A.Tsyremzhitova, A.Tsyrenzhapova, T. Dembelova, B.Badmaev (Russia)

P5. **Investigation of reversed-micellar solutions of stable silver nanoparticles by means of high-performance liquid chromatography**
A.D. Shafigulina, O.G. Larionov, A.A. Revina (Russia)

P6. **Molecular dynamics simulations of explicit water contribution to electrostatic field of micelles**
A.A. Vanin, E.N. Brodskaya (Russia)

P7. **Molecular simulations of local fluid distribution in the asymmetric cylindrical nanoslit**
A.A. Vanin, E.N. Brodskaya (Russia)

P8. **Amino acids adducts with basic metals formation on different surfaces**
E.S.Kuznetsova, A.K.Buryak, G.A.Petukhova, I.S. Pytsky (Russia)

P9. **Chemistry and morphology of different surfaces influence on energy characteristics of ionization**
I.S. Pytsky, A.K.Buryak (Russia)

P10. **Approximations of kinetic dependences of foam collapse containing surfactants with polyvinyl alcohol**
Kaumenova G., Ospanova Zh.B. , Musabekov K.B., Asadov M.M. (Kazakhstan)

P11. **Transfer phenomena in the media with large tortuous surface**
D.M. Kurmasheva, V.G. Artemov, P.O. Kapralov, V.D. Travkin, V.I. Tikhonov, A.A. Volkov (Russia)

P12. **Monolayer properties of the crown-ether derivatives at the mercury salt interfaces**
Zaitsev I.S., Tsarkova M.S., Zaitsev S.Yu. (Russia)

P13. **Brewster angle microscopy visualization of the lipid - protein membranes**
Zaitsev S.Yu.a, Solovyeva D.O. (Russia)

P14. **Intracellular transport and localization of a novel photoactivateble fluorescent dye in the immortalized A431 cell culture using selective fluorescent probe**
Generalov A.A., Shaposhnikov M.N., Zaitsev S.Yu (Russia)

P15. **Surface and electrosurface characterization of multiwall N-doped oxidized carbon nanotubes**
S. Barany, L. Vanyorek and R. Meszaros (Hungary)

P16. **Electrosurface properties and stability of multi-walled carbon nanotubes in aqueous suspensions with and without Laponite**
M. Manilo, N. Lebovka and S. Barany (Ukrain, Hungary)

P17. **Stationary configuration of liquid surface on superhydrophobic material**
Ageeva M. A., Popov I. Yu., Chivilikhin S. A. (Russia)

P18. **The resonance mechanisms of the anion specific adsorption at the metal-electrolyte interfaces**
Kuklin R., Emets V. (Russia)

P19. **Theoretical study of Van der Waals dispersion pressures of two-dimensional periodic material distributions**
H. Matsuoka, N. Kitahama, and S. Fukui (Japan)

P20. **Interaction of hydrophobic particles with solid water films**
Malenkov G. (Russia)

P21. **Account of capillary effects in the simulation of interaction between AFM probe and specimen**
Uzhegova N.I., Svistkov A.L. (Russia)

P22. **On the frequency of non axial symmetric eigenmode oscillations of a liquid drop on a substrate**
Yu.M. Zaslavsky (Russia)

P23. **Application of high resolution scanning electron microscopy for studying the superhydrophobic textured surfaces**
A.G. Domantovsky, A.M. Emelyanenko, L.B. Boinovich (Russia)

PLENARY and KEYNOTE LECTURES

P10

APPROXIMATIONS OF KINETIC DEPENDENCES OF FOAM COLLAPSE CONTAINING SURFACTANTS WITH POLYVINYL ALCOHOL

Kaumenova G.[a], Ospanova Zh.B.[a], Musabekov K.B.[a], Asadov M.M.[b]
[a] *Al- Farabi Kazakh National University, Kazakhstan, zhanospan@mail.ru*
[b] *Institute of Chemical Problems of NASA, Azerbaijan*

Kinetic characteristics of physical and chemical processes in heterogeneous systems, in particular blowing systems, can be determined from the analysis of linear approximations of the time dependence of the properties in the vicinity of the critical points. With this aim in this work experimental data estimate kinetic dependencies destruction foams obtained from mixtures of surfactants with polyvinyl alcohol. The experiments were as foamers using surfactants: anionic sodium dodecyl sulfate (DDSNa) $C_{12}H_{25}OSO_3Na$ and cationic cetyltrimethylammonium bromide (CTAB) $C_{16}H_{33}N(CH_3)_3Br$, and their mixtures with nonionic polymer polyvinyl alcohol (PVA).

Linear approximations of the time dependence of the foaming capacity for the above systems have the same look. The reaction rate restructuring in the formation of foam systems can be considered under the provisions of the chemical kinetics of heterogeneous processes. Then you can take that to the speed of adjustment to the structure of these components with increasing time is proportional to the product of the chemical reaction rate constant and the diffusion coefficient of polyvinyl alcohol. The experimental data were fitted by two-parameter linear regression equation of general form V = a + b log t, their coefficients were calculated by the method of least squares. The resulting linear regression equation for kinetic curves of destruction of the stabilized foam by surfactants and compositions are as follows:

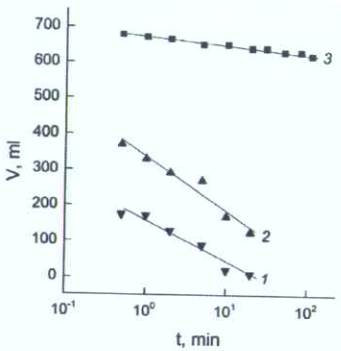

Figure. Kinetic curves the collapse of the foams: 1 - 1×10^{-3}; 2 – 1×10^{-2} mol/l DDSNa, 3 - n = 1, where [1×10^{-2} mol/l DDSNa] / [1×10^{-2} basics- mol/l PVA]

V = 157.52 - 116.044 log t (for curve 1 r is equal 0.94169)
V = 336.11 - 151.212 log t (for curve 2 r is equal 0.9425)
V = 673.71 - 24.909 log t (for curve 3 r is equal 0.97232)

The incorporation of polyvinyl alcohol to the system significantly enhances stability of these, obtaining by using foams using surfactants. This is due to the formation of associates between PVA and surfactant by hydrogen bonds are stabilized by hydrophobic interactions, resulting in a substantial change of the hydrophilic-lipophilic balance and the surface activity of the segments of the macromolecules of PVA, which improves the foam-stabilizing properties.

P11

TRANSFER PHENOMENA IN THE MEDIA WITH LARGE TORTUOUS SURFACE

D.M. Kurmasheva, V.G. Artemov, P.O. Kapralov, V.D. Travkin, V.I. Tikhonov, A.A. Volkov
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Hear we report about the porous materials research using water molecules as the effective probe of the tortuous surface and the effective tool of the sorption parameters investigation. The measurement methods and experimental techniques for adsorption experiments with water vapor are considered. The device for water vapor - porous materials interaction research, which implements the spectral detection of water molecules with high registration speed (10 Hz), wide dynamic concentration range and sensitivity better than 0.1 mTorr (10^{14} cm^{-3} or 0.003 μg) was modified [1]. The ability to operate at low pressures (up to 1 ppb) allows to study both Poiseuille and Knudsen (collision-free) gas dynamics in the time scale from milliseconds to several hours, and obtain the most important parameters of the water molecules interaction with the porous surface [2].

Using the method we measured the formation of the concentration-thermal gradient near the porous surface, and traced its temporal evolution [3]. The effects found can be used to accelerate the process of mass transfer and filling speed of the porous media by porous substances.

[1] V.G. Artemov, P.O. Kapralov, D.M. Kurmasheva, V.I. Tikhonov, A.A. Volkov, Instruments and Experimental Techniques, **56** (2013) 602.
[2] D.M. Kurmasheva, V.D. Travkin, P.O. Kapralov, V.G. Artemov, V.I. Tikhonov, A.A. Volkov, E.S. Zhukova, D.G. Artemova, N.P. Chirskaia, Bulletin of the Lebedev Physics Institute, 2013 (in press).
[3] V.G. Artemov, D.M. Kurmasheva, P.O. Kapralov, V.D. Travkin, V.I. Tikhonov, A.A. Volkov, Bulletin of the Russian Academy of Sciences: Physics, 2013 (in press).