The 15th International Conference of Physical Chemistry

CONFERENCE PROGRAM

ROMPHYSCHEM 15

September 11-13, 2013, Bucharest, ROMANIA

ROMANIAN ACADEMY
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organizers

"Ilie Murgulescu" Institute of Physical Chemistry Bucharest
Department of Physical Chemistry, Faculty of Chemistry,
ALPHA Association

ANCS
AUTORITATEA NATIONALA PENTRU CERCETARE STIINTIFICA

S2-P18	Oxygen vacancies in barium titanate: structural, thermodynamic and electrical correlation *Florentina Maxim, Florina Teodorescu and Speranta Tanasescu*
S2-P19	Thermodynamic and electrical properties of Ba-Sr-Co-Fe-O perovskite type oxide *Florina Teodorescu, Alina Botea-Petcu, Florentina Maxim and Speranța Tănăsescu*
S2-P20	Thermodynamic measurements in the Ag-Cu nanoalloys *Alexandru Milea, Oana Gîngu, Anca Sofronia , Florentina Maxim and Speranța Tănăsescu*
S2-P21	On bimodal thermal denaturation of collagen type I *Marin Micutz, Teodora Staicu, Viorel Cîrcu, Corneliu Ghica, Gabriela Ioniță and Vlad Tudor Popa*
S2-P22	Thermal decomposition kinetics of bis(pyridine)manganese(II) chloride *Mihaela Badea, Petru Budrugeac, Eugen Segal and Andrei Cucoş*
S2-P23	Characterization of cellulose acetate phthalate/ethylcellulose films by thermal analysis and FTIR spectroscopy *Mihaela Dorina Onofrei, Adina Maria Dobos and Silvia Ioan*
S2-P24	On the kinetics of ZnO 1D nanostructures formation from solution *Viorica Musat, Monica Mazilu and Eugen Segal*
S2-P25	Explosion of gaseous ethylene-air mixtures in closed cylindrical vessels with asymmetrical ignition *Codina Movileanu, Domnina Razus and Vasile Gosa*
S2-P26	Flame propagation in near-limit fuel-air-inert gaseous mixtures *Venera Giurcan, Domnina Razus, Maria Mitu and Dumitru Oancea*
S2-P27	Inert gas influence on propagation parameters of propane-air mixtures *Venera Giurcan, Maria Mitu, Domnina Razus, Codina Movileanu and Dumitru Oancea*
S2-P28	Conformational properties of quaternized polysulfone for specific applications *Raluca Marinica Albu, Ecaterina Avram, Iuliana Stoica and Silvia Ioan*
S2-P29	Pseudoplastic behaviour of quaternized polysulfone/poly(vinylidene fluoride) blends, with implications in cellular engineering *Luminita-Ioana Buruiana, Ecaterina Avram, Adriana Popa and Silvia Ioan*
S2-P30	Effect of polyvinyl alcohol additive on the morphological characteristics of functionalized polysulfone membranes *Anca Filimon, Ecaterina Avram and Silvia Ioan*
S2-P31	Reactivity ratios assessment for acrylonitrile copolymerization with etoxylated co-monomers *Andrei Sârbu, Teodor Sandu, Ana-Mihaela Florea and Liliana Sârbu*
S2-P32	Influence of casting solution properties on the morphological characteristics of some alicyclic polyimides films *Silvia Ioan, Anca Filimon, Camelia Hulubei and Iulia Stoica*
S2-P33	Detailed desorption study of dye molecule from polymeric material: Effect of pH, temperature, contact time and initial concentration *George Kyzas, Nikolaos Lazaridis and Margaritis Kostoglou*

Section 3: Surface phenomena. Colloids.

S3-P01	Effect of cholesterol-poly(N,N-dimethylaminoethyl methacrylate) on the properties of stimuli-responsive polymer liposome complexes *Patrícia Alves, Elizabeth Tymczyszyn, Ayelen Hugo, André Ferreira, Rui Fausto, Pablo Pérez, Jorge Coelho, Pedro Simões and Andrea Gomez-Zavaglia*
S3-P02	Functionalization of poly(dimethyl siloxane) membranes for the development of voice prosthesis *Paula Ferreira, Álvaro Carvalho, Ayelen Hugo, Tiago Valente, Ilídio Correia and Patrícia Alves*
S3-P03	Surface modification of polyurethane membranes by plasma and ultraviolet light to improve haemocompatibility and cell adhesion *Patrícia Alves, Rute Cardoso, Tiago Valente, Ilídio Correia and Paula Ferreira*
S3-P04	The effect of some hydrophobically modified polyacrylates in aqueous solutions *Ludmila Aricov, Adriana Baran, Alina Iovescu, Marieta Balcan, Elena Livia Vasilescu, Ioana Cătălina Văcăreşteanu, Cristina Florentina Mihăilescu and Dan Florin Anghel*

Detailed desorption study of dye molecule from polymeric material: Effect of pH, temperature, contact time and initial concentration

George Z. Kyzas, Nikolaos K. Lazaridis and Margaritis Kostoglou

Laboratory of General & Inorganic Chemical Technology, Aristotle University of Thessaloniki, Greece

Desorption is the reverse phenomenon of adsorption. Although adsorption process is widely studied, desorption has limited attempts of investigation, given its complexity. In the present study, the detailed desorption study was investigated in order to reveal the effect of particular parameters on this process. A modified polymeric material (chitosan) was used as adsorbent, which was previously grafted with amido groups (to enhance its adsorption capacity) and cross-linked with glutaraldehyde (to increase its resistance to extreme pH conditions). An orange reactive dye was used as pollutant for the adsorbent-pollutant system. At first, adsorption experiments were performed to "load" the adsorbent with dye. Then, the adsorbent particles were collected, separated and performed for desorption experiments. The effect of pH on desorption was evaluated showing the just reverse pH-behavior of two phenomena. Desorption kinetic tests were revealed the extremely rapid de-loading of adsorbents. In addition, the initial dye concentration showed an influence on the desorption behavior of material. An interesting finding was the reverse temperature-behavior in desorption compared to adsorption. Although the increase from 25 to 65 °C on adsorption caused augmentation to adsorption capacity, the respective temperature change on desorption presented a deterioration of desorption percentages.

Detailed desorption study of dye molecule from polymeric material: Effect of pH, temperature, contact time and initial concentration

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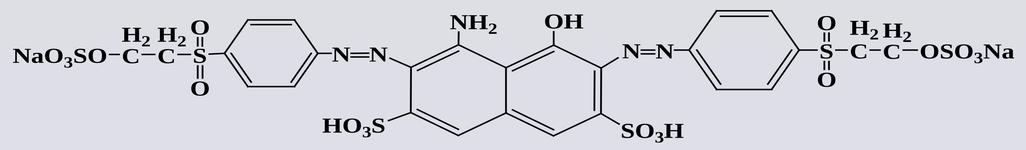
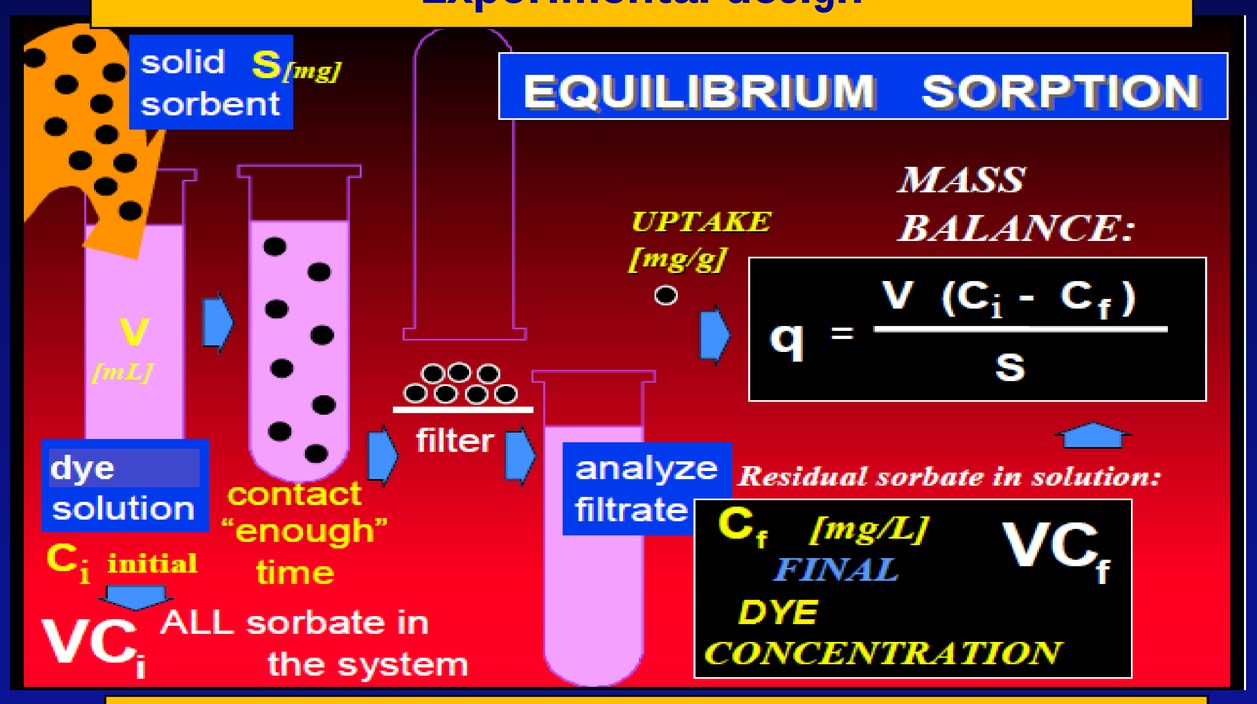
Abstract

Desorption is the reverse phenomenon of adsorption. Although adsorption process is widely studied, desorption has limited attempts of investigation, given its complexity. In the present study, the detailed desorption study was investigated in order to reveal the effect of particular parameters on this process. A modified polymeric material (chitosan) was used as adsorbent, which was previously grafted with amido groups (to enhance its adsorption capacity) and cross-linked with glutaraldehyde (to increase its resistance to extreme pH conditions). An orange reactive dye was used as pollutant for the adsorbent-pollutant system. At first, adsorption experiments were performed to "load" the adsorbent with dye. Then, the adsorbent particles were collected, separated and performed for desorption experiments. The effect of pH on desorption was evaluated showing the just reverse pH-behavior of two phenomena. Desorption kinetic tests were revealed the extremely rapid de-loading of adsorbents. In addition, the initial dye concentration showed an influence on the desorption behavior of material. An interesting finding was the reverse temperature-behavior in desorption compared to adsorption. Although the increase from 25 to 65 °C on adsorption caused augmentation to adsorption capacity, the respective temperature change on desorption presented a deterioration of desorption percentages.

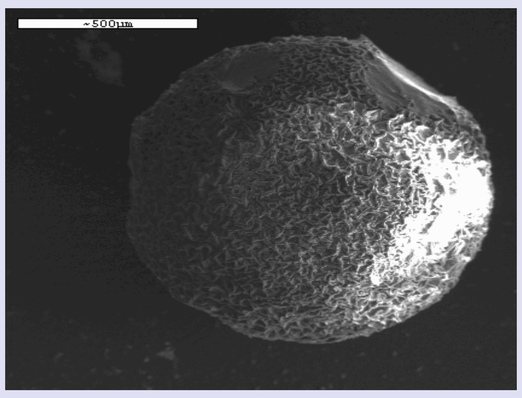
Orange reactive dye as model pollutant



Experimental design



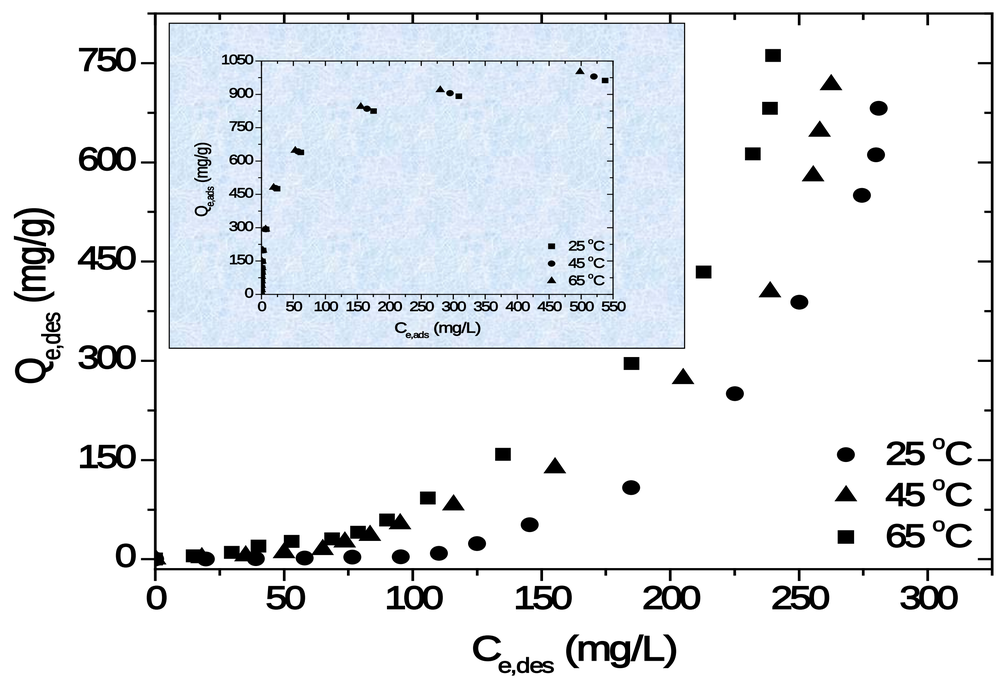
Synthesis of polymeric material (CSGAAm)



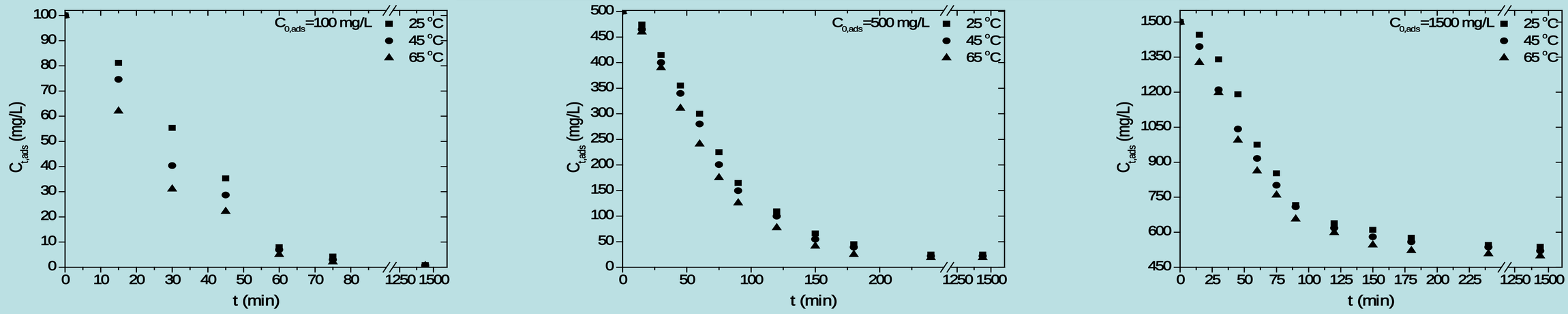
Beads of cross-linked chitosan were prepared by initially dissolving chitosan (polymeric material) (1.41×10^{-6} moles) in 50 mL of an aqueous solution of acetic acid (2% v/v). The solution was added dropwise from a pipette into an aqueous solution of glutaraldheyde (5×10^{-2} mol/L), which also contained tripolyphosphate (1.36×10^{-3} moles) at pH 6, adjusted with an aqueous HCl solution. The formed gelled beads were stirred overnight at room temperature in the aforementioned solution.

Then, after filtration and purification by extraction with water in a Soxhlet apparatus for 24 h, a conventional drying at 60 °C was realized. The resulting beads were used for further modification. The grafting reactions were carried out in aqueous suspensions of the beads. The cross-linked chitosan beads (1 g) were dispersed in an aqueous solution of acrylamide (AAm) (4.06×10^{-2} moles) with the use of a magnetic stirrer. After stirring for 1 h, a solution of the initiator (KPS, 6.7×10^{-4} moles) was added and stirring ensued for 15 min. The above solution (30 mL) was transferred in a 100 mL stoppered flask and placed in a thermostated bath (60 °C) for 3 h under continuous stirring. The solution was constantly purged with argon at all stages. The grafted beads were filtered and purified by extraction with water in a Soxhlet apparatus for 24 h to remove any unreacted reagent (monomer, initiator and its by-products with the eventually formed (PAAm) homopolymer). After drying at 50 °C the grafted beads were obtained with a grafting percentage of approximately 40 % for AAm, denoted as CSGAAm.

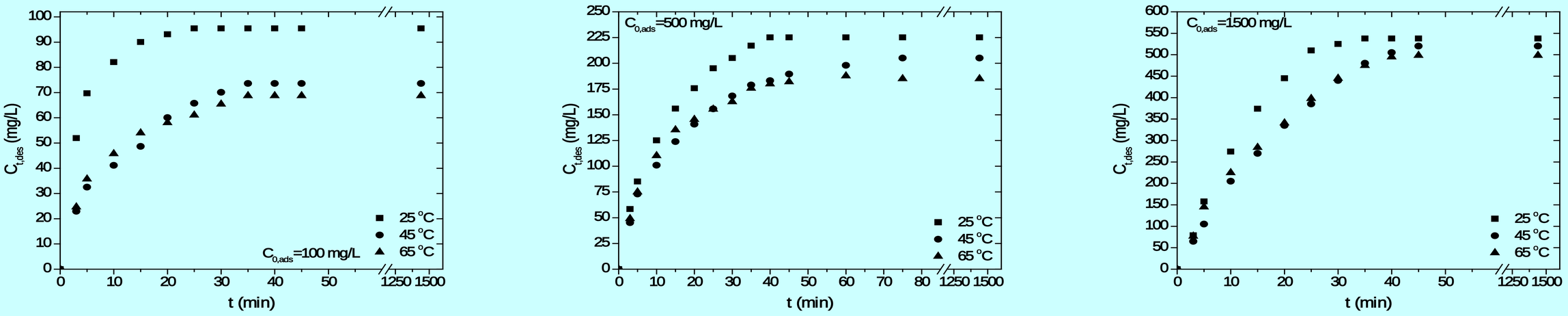
Equilibrium results - Analysis



Adsorption kinetics - Analysis



Desorption kinetics - Analysis



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of
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Certificate of Attendance

This is to confirm that PhD Researcher

George KYZAS

from

Laboratory of General & Inorganic Chemical Technology, Aristotle University of Thessaloniki, Greece

presented the scientific contribution

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authors:

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as poster presentation

at

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organized by:

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University of Bucharest Dept. of Physical Chemistry

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