

Adsorption of Textile Dyes on Crosslinked Chitosan Particles: Kinetics, Equilibrium and Thermodynamics

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ABSTRACT

Chitosan particles were prepared as a polymeric adsorbent by crosslinking method using glutaraldehyde as a crosslinker. The crosslinked chitosan particles were characterized by means of Fourier transform infrared (FTIR) spectra, scanning electron microscopy (SEM) and Brunauer, Emmett and Teller (BET) surface area analysis. The crosslinked chitosan particles were investigated for the removal availability of textile dyes from aqueous solution. For this purpose, the adsorption of Dimozol Red (DR) and Dimozol Yellow (DY) was studied in batch mode under various parameters such as adsorbent dosage, pH, contact time, temperature and initial dye concentration. The experimental results show that the adsorption was pH dependent with a high adsorption capacity of DR and DY in acidic range. Adsorption of textile dye ions reached equilibrium concentration in 72 hours. The adsorption capacities of the synthesized chitosan was 26.6 mg/g for dye DR and 28.2 mg/g for dye DY. The pseudo-second-order kinetic model provided the best fit to the experimental data for the adsorption of DR and DY textile dyes by the chitosan particles. The equilibrium adsorption data were analyzed by Langmuir, Freundlich and Dubinin-Radushkevich isotherm models. Thermodynamic parameters such as enthalpy change (ΔH°), free energy change (ΔG°) and entropy change (ΔS°) were estimated. The adsorption process was found to be spontaneous and exothermic in nature. Results indicated that the synthesized chitosan was shown to be a promising adsorbent for the removal of dyes from aqueous solutions.

Keywords: Adsorption, Chitosan, Equilibrium, Thermodynamics, Textile Dyes.



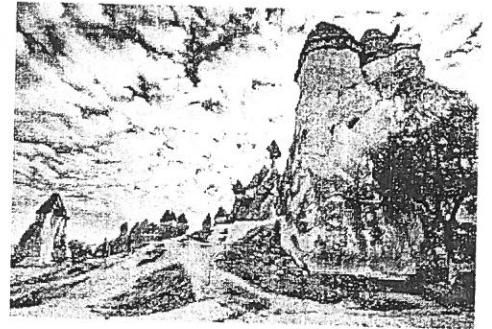
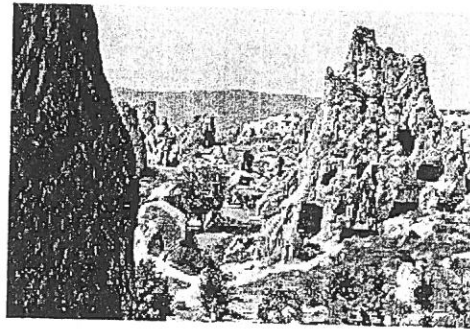
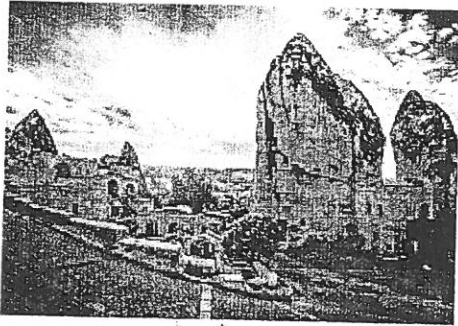
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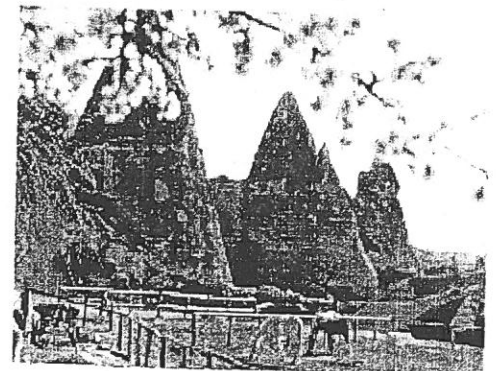
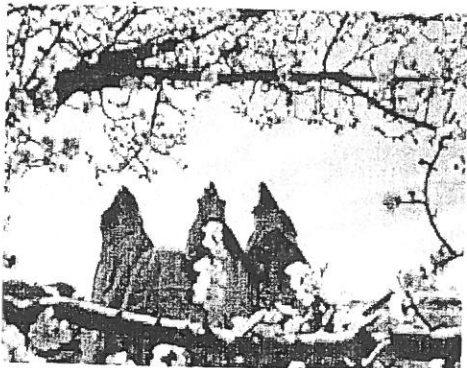
Events	Date
Submission Deadline of Extended Abstracts	April 15, 2017
Registration Deadline	April 15, 2017
Submission Deadline of Full Papers	April 15, 2017
The 2nd ICOCEE - Cappadocia Date	May 8 - 10, 2017

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Conference Topics

The 2nd ICOCEE - Cappadocia is an interdisciplinary scientific forum focusing on first Civil and Environmental Engineering for the presentation of technological advances and scientific research results in a wide spectrum. **The ICOCEE - Cappadocia** is soliciting state-of-the-art research papers in the following areas of interest:

Air Pollution & Control	Building Materials	Architectural Restoration
Noise Pollution & Control	Construction Management	Engineering Economics
Solid Waste Management	Construction Technologies	Engineering Law, Politics and Policy
Water Technologies	Digital Methods	Ecology
Wastewater Technologies	Geotechnical Engineering	Hydrobiology
Water & Soil Pollution	Hydraulic Engineering	Engineering Education
River Basin Management	Structural Engineering	Climate Change
Environmental Impact Analysis	Structural Mechanics	Renewable Energy Sources
City and Regional Planning	Transportation Engineering	Eco-Tourism
Recreation, Parks & Environment	Green Buildings	Geology, Geophysics and Mining



18:40-18:50	Assessment of Meteorological Drought by Different Methods in Nangarhar and Panshir Provinces of Kabul River Basin, Afghanistan	Electrooxidation of Treatment Stage Effluents (raw leachate, anoxic-aerobic oxidation and ultrafiltration) in Landfill Leachate Plant Using BDD Anodes	Modelling Spatial Correlation for the Evaluation of Network System Reliability	The detection of Polycyclic Aromatic Hydrocarbons (PAHs) Using Passive Sampler in Taurus Mountains, Turkey	Effect of Infiltration on Stability of Unsaturated Ophiolite Melange Soil Slope: A Case Study	Distribution of Absorbed Dose Rate and Annual Effective Dose of Goletdi-Direkli Region
18:50-19:00	Use of Star Type PEG Based Amphiphilic Polymers as Adsorbents	Nonleaching Polymeric Paint	Perception of Golden Ratio in Design	Samper in Taurus Mountains, Turkey	Educational Attainments of Civil Engineering Students from Their Internships	Determination of Concrete Properties by Seismic Velocities
19:00-19:10	Adsorption of Textile Dyes on Crosslinked Chitosan Particles: Kinetics, Equilibrium and Thermodynamics	Streaming Potential Measurements of Regenerated Cellulose Membrane using Cylindrical Cell and Adjustable Gap Cell	Reflections Of Color On Design In Turks	The Atmospheric Input of Indoxacarb to Tomatoes in Greenhouses	Effect of Steel and PVA Fiber Volume Fraction on the Deflection Hardening Behavior of Hybrid Fiber Reinforced Concrete	Evaluation of Performance of Asbestos Cement Pipes at Water Distribution Systems based on Environmental Factors
19:10-19:20	Significant Geogenic and Anthropogenic Factors Concerning Contamination of Groundwater Resources in Afghanistan	Modification and Characterization of Tea Waste for Removal of Dyes from Solutions	Displacement Measurement of T-Stub Connections by DIC Method	Investigation of Contribution of Volatile Organic Compounds (VOCs) to Ozone Concentrations at High Altitude Semi-Rural Site	Lead and Zinc Leaching with NaOH and FeCl ₃ from Zinc Extraction Residue under High Air Pressure	Geological and Geophysical Studies in Denizli-Buldani Geothermal Field

Session 3 - A						
08:00-08:10	<i>Chair: Aysegül Özgenc Aksoy</i> Use Of Riprap As A Countermeasure Against Local Scour Around Circular Bridge Pier Under Unsteady Flow	<i>Chair: Hakan Çelik</i> MW/CNT Usage for Removal Ammonium and COD in Activated Sludge Processes	<i>Chair: Şahin Ştezen</i> Displacement Measurement of T-Stub Connections by DIC Method	<i>Chair: Muhammed Kamil Öden</i> Treatability of Wastewaters Containing Methylene Blue with Ultrasonic Processes	<i>Chair: Yuhdetin Demir</i> Drought and Flood Analyses of Samsun City	<i>Chair: Uğur Kezik</i> Changing Land Use Pattern Affects the Soil Erosion: A case study in North of Turkey, Ordu-Ünye
08:10-08:20	Concrete Pavements in Comparison with Hot Mix Asphalt Pavement	Disinfection with Gas Chlorine and On-site Chlorine Generation in Drinking Water Facilities: Technical and Economical Comparison	Investigation Of Physical And Mechanical Properties Of Fly Ash Based Geopolymer Materials	Removal of Linear Alkyl Benzene Sulphonic Acid in aqueous solution by Ozone and Photocatalytic Ozone Processes	The Eco-minimicity Approach Towards Cityscape Design and Examples in the World	Sensitivity of the Seismic Performance Assessment of Special R/C Moment Frames to Seismic Hazard Regions
08:20-08:30	Use Of Collar As A Countermeasure Against Local Scour Around Circular Piles Under Regular Waves	Biodiesel Production From Waste Cooking Oil Using Biochar As Catalysts	Assessment Of Seismic Resistance Of Tokat Garipier Mosque Under Earthquake	Performance of NF/RO Integrated Membrane Process and Fouling Behavior for the Treatment of Real Dye Bath Wastewater	Re-naturalization with Soil-Bioengineering Technique on the Stream Landscape: An Experience in Modling of Lower Austria	Expected Seismic Hazard and Seismic Demand of Special R/C Moment Frames
08:30-08:40	A Laboratory Study: Influence of Foaming Water Content on Foam Asphalt Mixtures	Investigation of Effects of Recreational Activities on the Surface Soil Samples	Investigation of the accuracy of smart phone android software for measuring traffic noise pollution	Treatment of Nanofiltration Membrane Concentrate of Real Dye Bath Wastewater by Fenton and Advanced Fenton	Buckling Analysis Of Orthotropic Complete Conical Shells Subjected To Lateral Pressure Withun Shear Deformation Theory	The Investigation of Using of Colemanite in Soil Stabilization
08:40-08:50	Investigation of Energy Efficient Design with Double Skin Facades (DSF) for Sustainable Development	Pollution Levels of Gölçuk Lake, Bolu	Examination of Structural Performance of A Single Domed Tomb Structure	Phosphate Removal from Domestic Wastewater in Electrocoagulation Reactor Using Al-Fe Hybrid Anodes	Punching Shear Behavior of Small Supported Column with Axial Force and End Mass	Analysis of Reinforced Concrete Buildings with Infill Walls
09:00-09:10	Investigation of Bursa, Inayet Village's Formation with Schlumberger Array	Determination of the Groundwater Potential of Deep Aquifers of Diyarbakir City	Effect of the Input Parameters on Optimum Design Cost of Reinforced Concrete Cantilever Retaining Walls	Electrooxidation of Ultrafiltration Effluent in a Landfill Leachate Treatment Plant by DSA Anodes	Transverse Vibrations of an Elastically Supported Column with Axial Force	Numerical Solution of Advection-Dispersion Equation Using Operator Splitting Method