

Physico-chemical Parameters Study of Sewage From Open Sewerage System of Urban Areas of Aurangabad City

G.B. Rakh and M.B. Mule

Dr. Babasaheb Ambedkar Marathwada University, Department of Environmental Science, Aurangabad

Rapid urbanization is observing in India. The urbanization results in some environmental problems, such as water resource pollution due to disposal of sewage or wastewater. To reduce the intensity of such problems the efficient utilization of water resources is necessary and which may maintain the quality of water resources. The present investigation deals with sewage characterization to know the parameters of sewage generated in Aurangabad city, to assess existing pollution load in sewage system and to predict needed to adopt proper sewage treatment system for balance and better healthy environment in urban areas. The sewage samples were collected from various places of the Aurangabad city during the months of April and November, 2013. The pH and temperature were analyzed at the sampling sites and other parameters, namely turbidity, total solids (TS), total dissolved solids (TDS), total suspended solids (TSS), dissolved oxygen (DO), chlorides, chemical oxygen demand (COD), biological oxygen demand (BOD), total hardness, nitrate, sulphate and phosphate were determined as a quality indicating parameters. The pre-monsoon quality study of sewage shows higher values to most of the parameters when compared with post-monsoon season's quality parameters. In the post-monsoon season pollutants load in the sewage was found within permissible standard limits given by Central Pollution Control Board (CPCB), India.

Keywords

Urbanization, Sewage, Physico-chemical parameters, COD, BOD

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Removal of Heavy Metals Using Nano Particles - A Review

V. Yogeshwaran¹ and A. K. Priya²

1. Sri Krishna College of Engineering and Technology, Department of Civil Engineering, Coimbatore

2. KPR Institute of Engineering and Technology, Department of Civil Engineering, Coimbatore

Presence of heavy metals (Cr⁶⁺, Zn²⁺, Pb²⁺, Mg²⁺) in water and wastewater is a very big issue for nature and also it contaminates the groundwater level. It is very toxic for living organisms and it causes major environmental problems. It is non-biodegradable and accumulates in the environment for a very long time. Removal of these heavy metal concentrations in the water and wastewater is the most complicated process. Many methods (chemical precipitation, electrodialysis, adsorption, membrane filtration and phytoremediation) are used to reduce the heavy metal concentration from the industrial wastewater. Among these methods, adsorption is one of the cost-effective methods being widely used to reduce the concentration level of the heavy metals from the contaminated water using the various adsorbents. But due to the particle size and variable properties of different adsorbents, the removal efficiency of these heavy metals is getting considerably reduced. This review article presents the information about the application of different kinds of nano-particles for the removal of heavy metals from industrial effluent.

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Environmental Sustainability and Electronic Media : Prospects and Perspectives

Abdullah Khan¹ and Aman Vats²

1. Amity University Uttar Pradesh, Amity School of Communication, Noida

2. Amity University Uttar Pradesh, Amity School of Film and Drama, Noida

Television is an amazing medium for advancing awareness, improving situations, proficiency, social awareness and political cognizance. The proposed inquiry is aimed at understanding the role electronic media can play in environmental sustainability objectives. This paper explores how India's english-medium electronic media speaks about climate and sustainable development issues. The study further adds to the existing knowledge on the dynamics of media and environment from the stakeholder perspective. The paper attempts to answer the critical questions regarding communication related challenges in dissemination of information regarding environmental issues to the masses. The present examination is constrained to five english news channels of India. These are DD News, CNN-News 18, NDTV 24x7, Times Now and India Today.

Keywords

Environmental awareness, Climate change, Environmental sustainability, Electronic media

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Wetland Vegetation in Sludge Treatment Wetland : a Review

R. M. Garud¹ and G. R. Munavalli²

1. Sharad Institute of Technology, Department of Civil Engineering, College of Engineering, Yadrav, Kolhapur

2. Walchand College of Engineering, Department of Civil Engineering, Sangli

The presence of wetland vegetation in sludge treatment wetland (STW) is one of the most important aspects of wetlands and their presence distinguishes constructed treatment wetlands from sludge drying bed. The wetland vegetation is one of the design components as it undergoes and support the pollutant removal mechanism and depending upon the characteristics of sludge applied in the sludge treatment wetland. The wetland vegetation used in sludge treatment wetland should be tolerant of soils, climatic conditions and seasonal cycles of inundation and drought. In this review, we consider wetland vegetation that have been used in such studies to play an important role in sludge treatment wetland that take part in enhancing sludge dewatering and stabilization. The decomposition of organic matter present in sludge and wastewater through absorption by plant and microbial conversion forms soil-root-contaminant plant microbe system. The essential nutrients in sludge are converted into a useful end product through biological activity and make it safer for reuse and maintain soil fertility over long periods of time. *Phragmites australis* (common reed) species of the genera *Typha* (*latifolia*, *angustifolia*, *domingensis*, *orientalis* and *glauca*) and *Scirpus* (for example, *lacustris*, *validus*, *californicus* and *acutus*) spp. are used.

Keywords

Sludge treatment wetland, wetland vegetation, *Phragmites australis*

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Removal of Pb²⁺, Ni²⁺ and Cd²⁺ Ions Using Pyrrole Linked 4,4'-diaminodiphenyl Sulphone Copolymer Nanocomposite**Kanthapazham Rajakumar¹, Palanisamy Muthukumar¹ and Mahendiradas Dharmendirakumar²***1. Bannari Amman Institute of Technology, Department of Chemistry, Sathyamanagalam**2. Anna University, Department of Applied Science and Technology, Chennai*

Oxidized multi-walled carbon nanotubes (o-MWCNT) incorporated pyrrole (PPy) and 4, 4'-diaminodiphenyl sulphone (DDS) polymer nanocomposite (PPy-co-DDS/o-MWCNT) was prepared through in situ chemical oxidative polymerization. The molecular structure of PPy-co-DDS/o-MWCNT nanocomposite was characterized by attenuated total reflectance infrared spectroscopy (ATR), diffuse reflective ultraviolet-visible spectroscopy (DRS UV-vis), Raman spectroscopy. The crystallographic profiles of nanocomposite were evaluated by x-ray diffraction analysis and thermal stability of adsorbent was examined by thermogravimetric analysis (TGA). The morphology of polymer nanocomposite adsorbent was studied by scanning electron microscope (SEM), energy dispersive x-ray analysis (EDX) and transmission electron microscope (TEM) with selective area electron diffraction pattern (SAED). The adsorption behaviour of PPy-co-DDS/o-MWCNT nanocomposite showed high adsorption capacity (470 mg/g, 462 mg/g, 452 mg/g) towards corresponding heavy metal ions, such as Pb(II), Ni(II) and Cd(II) in aqueous solution. The PPy-co-DDS/o-MWCNT nanocomposite shows fast and spontaneous process for the removal of heavy metal ions adsorption and the kinetics followed a pseudo second order rate equation ($R^2 \gg 0.99$). This result is perhaps due to the part of electrostatic attraction served as an oxidized MWCNT can be incorporated to the PPy-co-DDS structure to improve the removal of heavy metal ions of fabricated PPy-co-DDS/o-MWCNT copolymer nanocomposite.

Keywords

Copolymer nanocomposite, Adsorption, Kinetics, Isotherm, Thermodynamics

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Bulk Heterojunction Organic Photovoltaic Cells Attained By Polymer (Go/Pedot:Pss) As Hole Transport Layer**R. Mugundhan¹ and Ashok Kumar Dasmahapatra²***1. Hindustan Institute of Technology and Science, Department of Chemical Engineering, Chennai**2. Indian Institute of Technology, Department of Chemical Engineering, Guwahati*

The world's current major electricity supply is produced from non-renewable energy sources and it won't be available once it is fully used as it is depleting at a faster rate. Among the other renewable sources, solar energy is the most promising and inexhaustible source. Organic photovoltaic cells possess low manufacturing cost, flexibility, lightweight, portable and these are the major reasons for pushing the focus on organic solar cells. This report aims to discuss the potential use of an organic solar cell and tweaks made to increase its efficiency. A novel device architecture is developed and a slight modification in the active layer P3HT: PC61BM [poly(3-hexylthiophene):[6,6]-phenyl-c61-butyric acid methyl ester] weight ratio of (1:1.2) which will promote a better electron extraction and increase absorption in UV region. The GO/PEDOT: PSS is used as an hole transport layer (HTL) in the organic solar cell. Mostly organic solar cells can be easily degraded over a period of time. In this work, organic photovoltaic (OPV) cell was fabricated and checked for its stability. While reporting about its performance, the organic photovoltaic cells will play a vital role in the near future if the drawbacks are rectified.

Keywords

Organic solar cell, P3HT: PC61BM, UV region, GO/PEDOT:PSS as hole transport layer (HTL)

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Integration Of Cooking Trays For Waste Heat Recovery In The Energy Efficient Wood Stove

K.M. Prasannakumaran, M. Karthikeyan, C. Sanjay Kumar, D. Premkumar and V. Kirubakaran

The Gandhigram Rural Institute (Deemed to be University), Centre for Rural Energy, Gandhigram, Dindigul

Usage of a wood stove in rural India is inevitable. The people have traditionally used three stone stove for the cooking requirements. Many of the restaurants also followed the same for meeting out the thermal requirements. The smoke coming out of the stove will have health issue on rural women. The child and infant also seriously affected on the particulate matter from the stove. The proposed paper analyzed the above improved wooden stove to enhance the efficiency as well to reduce the pollution to the atmosphere. This paper is further analyzed to reduce the heat loss from the wall of the stove by incorporating waste heat recovery systems on the wall side to enhance the efficiency on the improved stove as well as a reduction in pollution level.

Keywords

Improved cook stove, Waste heat recovery, Smoke

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Experimental Study of Biogas Fueled Diesel Engine

Harsh Raj¹, Mohammed Mubarak¹, Naseem Khayum² and M.R. Kamesh¹

1. Dayananda Sagar College of Engineering, Department of Mechanical Engineering, Bengaluru

2. National Institute of Technology, Department of Mechanical Engineering, Rourkela

Biomass derived fuels have the potential to replace the existing fossil fuels because they are renewable and available in a large quantity. In this investigation, an attempt was made to study the effect of creating turbulence in biogas fueled direct injection (DI) diesel engine on the performance parameters of the engine. For this purpose, waste cooking oil methyl ester (WCOME) was used as a pilot fuel and biogas at a flow rate of 0.75 kg/hr was inducted into the engine cylinder through the intake manifold alongwith the air in a 4.4 kW single cylinder, four strokes, air cooled, direct injection diesel engine running at a constant speed of 1500 rpm. Turbulence was created by introducing micro holes in the piston. The performance of the engine was assessed and the results were compared with those of the dual fuel mode engine run with the conventional piston, and the stand-alone diesel operation and the results are presented in this paper.

Keywords

Biomass, Turbulence, Waste cooking oil methyl ester, Biogas

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Study on Influence of Coir and Chemicals in Properties of Expansive soils**V. Jeevanantham¹ and J. Jayashree²***1. Bannari Amman Institute of Technology, Department of Civil Engineering, Sathyamangalam**2. Sri Ramakrishna Institute of Technology, Department of Civil Engineering, Coimbatore*

Expansive soils exhibit low shear strength, consolidation settlement, swelling and shrinkage, etc., when in contact with water. In order to improve the engineering properties, the common method used is stabilization. In this project, experimentation is carried out to investigate the influence of additives, such as flyash, potassium chloride and coir on compressive strength, California bearing ratio and shear strength of the clay soil. The three additives are added and the tests are carried out by keeping flyash and potassium chloride proportions as constant (30% and 1%) and varying the proportion of coir (0.1%, 0.2%, 0.3% and 0.4%). Control sample with separate addition of flyash (30%), potassium chloride (1%) and a combination of potassium chloride and flyash (30% and 1%) are analyzed for index properties. In addition, coir is added and the engineering properties are also analyzed. The maximum dry density of flyash and potassium chloride added soil goes on increasing with addition of coir upto 0.3% by weight and then it gets decreased. But the optimum moisture content goes on decreasing by increasing the percentage of coir. The results shows improvement in california bearing ratio (CBR) value, compressive strength and shear strength of composite containing flyash, potassium chloride and coir (30% : 1% : 0.3%). Hence the addition of flyash, potassium chloride and coir can be effectively used for soil stabilization.

Keywords

Expansive soil, Flyash, Potassium chloride, Coir, Shear strength, Compaction, Compressive strength, California bearing ratio (CBR)

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Venkara Muthyalu, P., K. Ramu and G.V.R. Prasad Raju. Study on performance of chemically stabilized expansive soil. *Int. J. Advances in Eng. and Tech.*

Comparative study on the mechanical properties of Sisal Fibre Reinforced Concrete with Conventional Concrete**S. Dhivya Bharathi, M. Ranjitham and R. Sanjitha***Bannari Amman Institute of Technology, Department of Civil Engineering, Sathyamangalam*

The advancement in innovation and technology has been towards the usage of cheap and durable materials in concrete which contributes to sustainable development. This article focuses on the application of natural fibre reinforced concrete. Natural fibres are now considered as a suitable reinforcing material in concrete due to their greater advantage, such as low cost, high strength-weight ratio and recyclability. The study is mainly concentrating to arrest the crack in a concrete by utilizing naturally available sisal fibre. This is achieved by determining the fresh and hardened properties of concrete with and without the usage of sisal fibre. The optimum percentage of the sisal fibre can be found out from these tests. The results of the sisal fibre reinforced concrete and the conventional concrete are compared and the durability of the concrete is evaluated.

Keywords

Conventional concrete, Durability, Fibre reinforced concrete, Sisal fibre, Tensile cracks

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Study of MASrCl₃ and MASr(1-x)Sn(x)Cl₃ Perovskite As Light Harvesting Material in Optoelectronic Devices**N. Gopinathan, S. Mohamed Asif and S. Sathik Basha***B.S. Abdur Rahman Crescent Institute of Science and Technology, Chennai*

In the past decades, the organic-inorganic halide perovskites (OHIP) based materials are the fast developing area in the field of material science. It has tremendous growth in the new generation of optoelectronic devices, such as solar cells, light emitting diode and photodetectors. It is inexpensive, easy to process and highly crystalline in nature. It also has the disadvantages that the compounds contain toxic lead ions in their inorganic part. To overcome the toxicity of lead-containing material, we have synthesized strontium based organic-inorganic halide perovskites as the alternative material. The newly synthesized MASrCl₃ and MASr(1-x)Sn(x)Cl₃ has been characterized by x-ray diffraction, UV-Visible spectroscopy and photoluminescence for the analysis of crystalline, absorption and emission properties. This shows good absorption and emission properties for solar cells, LEDs, photodetector applications.

Keywords

Perovskite, Organic-inorganic halide perovskites, Light harvester, Optoelectronic devices

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N. Vaishnavi

Pondicherry Engineering College, Department of Mechanical Engineering, Puducherry

Pyrolysis of *Sterculia foetida* seed was performed at a heating rate of 5°C/min in nitrogen atmosphere at different temperatures of 450, 500, 550 and 600°C in order to find out the optimum temperature (550°C) for utmost liquid yield (68.8%, weight basis). The pyrolytic liquid was separated as oil and aqueous layer with a yield of 46.4% and 22.4% by weight, respectively. At an optimum temperature of 550°C, the maximum bio-oil yield of 24% was obtained alongwith 29.2% of biochar. The products of bio-oil was further physically and chemically characterized. The chemical characterization of bio-oil was carried out through FTIR analysis.

Keywords

Bio-oil, FTIR, Slow pyrolysis, *Sterculia foetida* seed

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