

# Energy and Environment





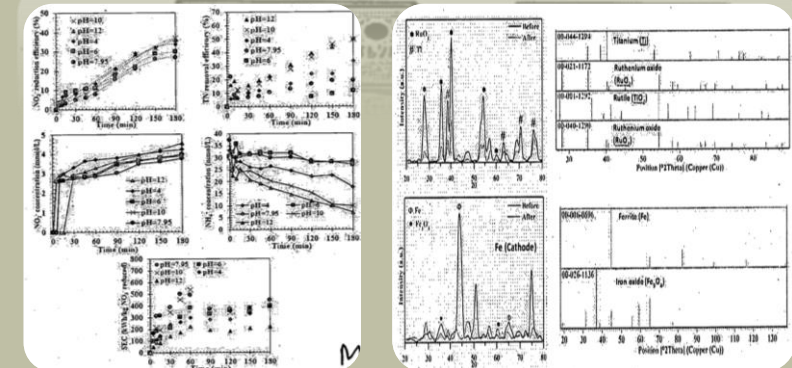
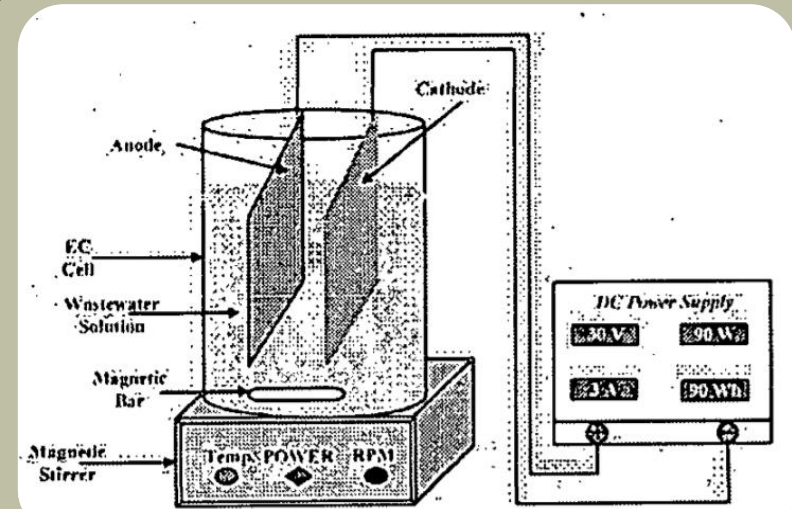
**Title:** A system and method of simultaneous denitrification and oxidation of industrial wastewaters

**Name of the inventor:** V.C. Srivastava and Rohit Chauhan (CHED)

**Application number:**201911046517(IN)

**Date of Patent Filing:** 15.11.2019

**Summary:** Present invention provides a system and method of simultaneous denitrification and oxidation of industrial wastewater. The invention reduces the nitrate ion as well as oxidation of the ammonia into the  $N_2$  gas in the industrial wastewater by electrochemical method. The reduction of the nitrate ion is available only for the synthetic wastewater solution.



**Title:**–Polyacrylonitrile–graphene–oxide–silver nanocomposite based fibrous for air purification.

**Name of the inventor:** P. Gopinath, Sanjeev Gandhi and Abhishek Sharma (BT)

**Application number:** 202011017645(IN)

**Date of Patent Filing:** 24.04.2020

**Summary:** The present invention relates to a nanofibrous membrane incorporated with filler materials such as graphene and silver nanoparticles under controlled conditions in order to achieve desirable pollutant removing properties. Thus apart from filtration of toxic pollutants in the atmosphere, this functionalized membrane filter having the interconnected nanofibrous web act as a barrier against the microbes and particles. The nanofibrous membrane is a supplement in the commercial air filter mask and is incorporated as a mid– layer in the commercial air filter masks

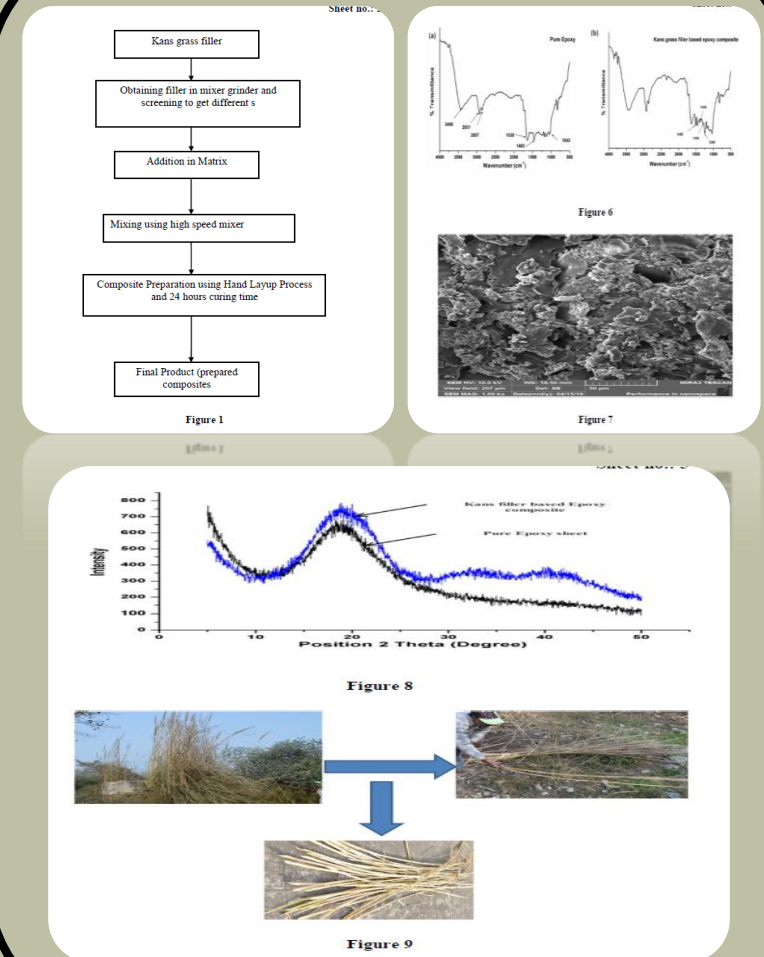
**Title:** Development of epoxy composites reinforced by waste Kans grass (*Saccharum Spontaneum*) filler by handlayup method

**Name of the inventor:** Shishir Sinha and G.L. Devnani (CHED & HBTU Kanpur)

**Application number:**202011051143(IN)

**Date of Patent Filing:**24.11.2020

**Summary:** Present invention relates to a process for development of epoxy composites reinforced by waste kans grass (*Saccharum Spontaneum*) filler by hand-layup method. The process consists of (a) mixing of dried filler and epoxy with the help of mixer at 1000–1500 rpm for 5 to 10 minutes; (b) Pouring of uniform mixture to give shape of sheet in a mold of size (300mm × 300 × 10mm) having antiadhesive coating; (c) Rolling of sheet with roller to remove bubble and voids; and finally (d) Putting a dead weight of 20–25 Kg for 24 hours to obtain the epoxy composite.





**Title:** A pot process for synthesis of nanometal carbon hybrids and bio-oils from metal contaminated waste water and biomass

**Name of the inventor:** N. Siva Mohan Reddy and Priyanka Yadav (CHED)

**Application number:**202011051146 (IN)

**Date of Patent Filing:**24.11.2020

**Summary:** Present invention relates to solid-state battery configuration having a flexible electrolyte-cum-separator sheet in which nanostructured high aspect ratio, interconnected ionically- conducting active filler is homogeneously distributed in the polymeric backbone. The developed flexible nanostructured sheet is not limited to use as a separator but also can be utilized as solid-electrolyte in all solid-state/metal batteries. The electrolyte-cum-separator sheet has been developed using optimized molar concentration of polymer and a definite weight% of nanostructured active fillers, which provides a high ion conductivity along with good thermal stability. By optimizing the process and system parameters the thickness and mechanical properties of flexible electrolyte-cum-separator sheet can also be easily tuned. The instant disclosure further includes electrochemical cell configuration where the processing of composite electrodes and its exposure with developed flexible electrolyte-cum-separator sheet are also set forth herein.

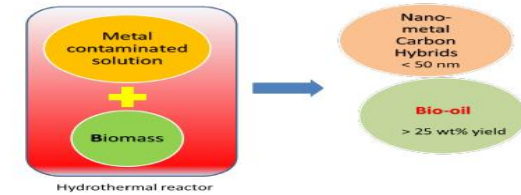


Figure 1

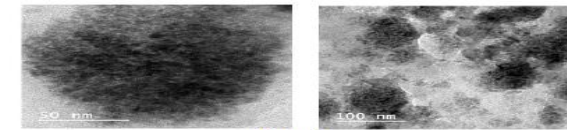


Figure 2

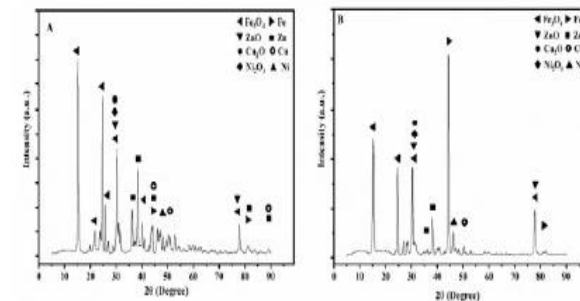


Figure 3

**Title:** Sono-electrochemical method for degradation/mineralization of pollutants in industrial wastewater

**Name of the inventor:** VC.S rivastava and Ritesh Patidar, (CHED)

**Application number:**202011055867(IN)

**Date of Patent Filing:**22.12.2020

**Summary:** The present invention relates to a process for degradation/mineralization of pollutants in the industrial wastewater by a sono-electrochemical reactor working either in batch or in continuous mode consists of electrochemical cell(s) with suitable sets of electrodes. The reactor is equipped with a system for producing ultrasound at a fixed frequency and power through a transducer. The industrial wastewater is an effluent stream from a personal care product/cosmetic/pharmaceutical industry or other industrial wastewaters. The process involves treating the wastewater from sono-electrochemical cell, which is contacted by the electrodes contained therein; due to the direct current supply through the electrochemical cell with the wastewater stream and irradiated through the ultrasound produced from the transducer the pollutants get mineralized, and treated water in the sono-electrochemical cell consists of lower pollutants concentrations.

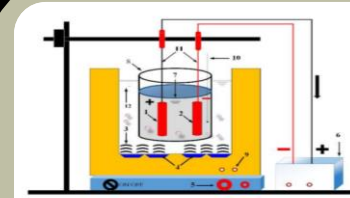


Figure 1

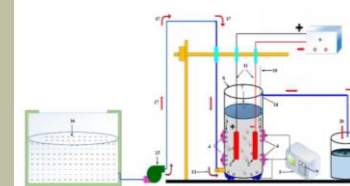


Figure 2

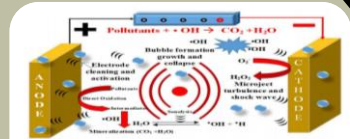


Figure 3

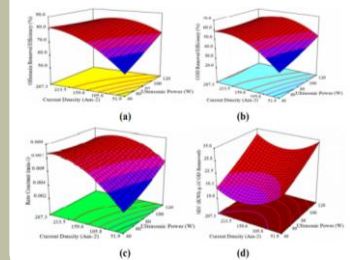


Figure 4

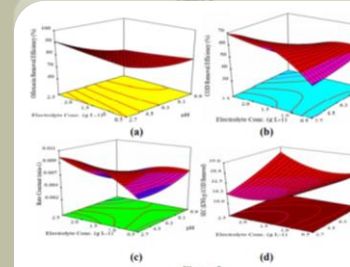
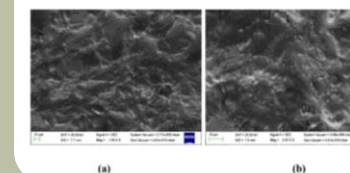


Figure 5



(a)

(b)

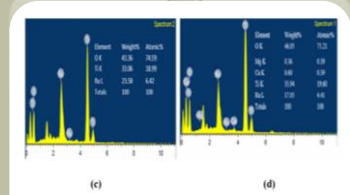


Figure 6

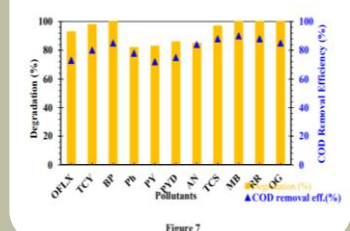


Figure 7



**Title:** *A process for production of Bio CNG from Biogas*

**Name of the inventor:** *B. Prasad (CHED)*

**Application number:** *202111016514 (IN)*

**Date of Patent Filing:** *08.04.2021*

**Summary:** *The present invention relates to a process for the production of Bio CNG from Biogas. The process involves pressurizing the biogas to a specific pressure and cooling down to a specific temperature. The impurities other than methane get separated in liquid form. On separation, the purified gas can be further pressurized for injection in to the natural gas pipeline networks or filling in cascade of cylinders. The process results in production of hydrogen sulphide and carbon dioxide in liquid forms. The recovered hydrogen sulphide can be converted to elemental sulphur by Claus process. The liquid carbon dioxide can be used in fire extinguishers, precision sand casting, homogenous cloud effect and breweries*

**Title:** *A rainfall simulator for moving storm condition.*

**Name of the inventor:** *Sumit Sen and Ravi Meena (HYD)*

**Application number:** *202111025193 (IN)*

**Date of Patent Filing:** *07.06.2021*

**Summary:** *The present invention relates to the rainfall simulator for moving storm condition. The rainfall simulator fabricated to simulate a moving storm rainfall condition. The rainfall simulator consists of an automated nozzle control system (e) coupled with a pressure regulator mechanism for a wide working range and an adjustable drop height above the soil flume surface. This simulator was able to simulate near natural rainfall conditions at varying spatial and temporal resolutions in a controlled environment.*