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Extraction of activated carbon from rice husk and its electrochemical characterization

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Now days, agricultural waste material are getting a wide exposure to the future generation of material science world. Rice husk is one of them, and its global production is approximately 140 million tons, annually. In the majority of cases much of the husk produced from the processing of rice is either burnt or dumped as a waste. In the present work, an attempt has been made to synthesize activated carbon (RHAC's) from Rice Husk via KOH and K_2CO_3 chemical activation. Activated Carbon is a potential electrode material of supercapacitor for energy storage applications. Supercapacitors can deliver high power and reasonable energy densities with both electrostatically and electrochemically as compared to batteries. Rice Husk was initially physically activated at temperature 300°C and 600°C in a furnace with a holding time of 1hr and the carbonized material thus obtained was soaked in 1M KOH and K_2CO_3, in 1:1 ratio for overnight and was followed physical activation at 300°C for 2hrs in a furnace. Activated Carbon thus obtained were characterized by x-ray diffraction method in order to know the presence of amorphous carbon, scanning electron microscopy to know the pore formation, fourier transform infrared spectroscopy analyses in order to identify the appearance and disappearance of functional groups during different activation temperatures and finally the cyclic voltammetry analysis was done to investigate the electrochemical behavior of the activated carbon material.

The K_2CO_3 - activated sample showed higher yield and better pore structures as compared to KOH-activated sample. XRD showed the presence of amorphous carbon at a diffraction peak 2theta equals to 26.2°and finally CV curves exhibit capacitive behavior showing nearly rectangular shape for different scan rates 50mV/s,25mV/s,20mV/s,10mV/s,5mV/s.

Keywords: Rice husk, Activated carbon, Physical and Chemical activation, FTIR, Cyclic Voltammetry.

Biography:

Bhavya Joshi joined National Institute of Technology, Kurukshetra, a premier engineering institute of India, to pursue her master's in the field of Nano Technology. Passionate about latest developments taking place in Nano Science around the world, the move to go for higher study in Nano Technology was a natural fit for her.With encouragement from family and friends, Bhavya after completing her Bachelors in Electronics and Communication engineering, has developed keen interest in the area of Nano Technology.She is convinced that the in the near future,Nano Technology will see the most advancement and will have the cutting edge technology which will rule the world in every field. She is very keen to make her career in Nano Technology by being a part of any research group. She is an avid reader and loves to travel a lot.