

## **A COMPARATIVE STUDY OF CARBON FOAMS PREPARED FROM WASTE POLYURETHANES UNDER DIFFERENT PYROLYSIS CONDITIONS.**

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Glassy/ vitreous carbon foams were produced from the waste polyurethane foams and elastomers by impregnating them in acidified sucrose solution followed by pyrolysis in an inert atmosphere and achieved carbon content of about 92% and 99% at 900 °C and 1000 °C, respectively. A comparative study of carbon foams synthesized at different pyrolysis and activation conditions and a well round of characterizations were done. An extremely high BET surface area (2127 m<sup>2</sup>/g) of carbon foam was obtained on a single step carbonization and activation process carried out at 1000 °C in CO<sub>2</sub> atmosphere. Thermogravimetric (TG) analysis showed the mass loss and the behaviour of impregnated polyurethane foams at different temperatures in N<sub>2</sub>, O<sub>2</sub> and CO<sub>2</sub> atmosphere. X-ray diffraction (XRD) and Raman analysis revealed that the obtained carbon foam is non-graphitized and glassy or vitreous in nature. The surface morphology of the carbon foams was investigated by Scanning Electron Microscopy (SEM) and High Resolution Transmission Electron Microscopy (HRTEM). Other parameters such as pore size distribution, density, electrical conductivity, hardness, strength, contact angle and zeta potential have also been measured. As a result, these carbon foams could be a promising material for energy storage devices, adsorption and filtration, catalyst support etc.