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Preparation of Carbon Monoliths from PET Waste and Their Use in Solar Interfacial Water Evaporation

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Abstract : 3D photothermal structure of carbon was synthesized using PET bottles waste and sodium chloride through controlled carbonization. Characterization techniques such as X-ray photoelectron spectroscopy, X-ray diffraction, BET, scanning electron microscopy (SEM), transmission electron microscopy (TEM), Raman spectroscopy, spectrophotometry, and mechanical compression were carried out. The carbon showed physical integrity > 90%, an absorbance > 90% between 300-1000nm of the solar spectrum, and a high specific surface area from 450 to 620 m2/g. The X-ray was employed to examine the phase structure; the obtained pattern shows an amorphous material. A higher intensity of band D with respect to band G was confirmed by Raman Spectroscopy. C-OH, COOH, C-O, and C-C bonds were obtained from the deconvolution of the high-resolution C1s orbital. Macropores of 160 to 180μm and micropores of 0.5 to 2nm were observed by SEM and TEM images, respectively. Such combined characteristics of carbon confer efficient evaporation of water under 1 sun irradiation > 60%.

Keywords : solar-absorber, carbon, water-evaporation, interfacial
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