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Cellular SiC ceramics from plant precursor by silica sol infiltration and carbothermal reduction processing

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Biomorphic SiC was prepared at high temperature by carbothermal reduction of plant-derived bio-carbonaceous skeletal preform infiltrated with sol-gel SiO_2. Two types of precursor plants representing dicotyledonous woods of mango, jack fruit and teak and gymnosperm pine of Indian origin were selected for pyrolytic conversion to carbon preforms which were infiltrated under atmospheric pressure and vacuum with water- and ethanol-based SiO_2 sol of concentration varying in the range of 15 to 40%. The SiO_2-infiltrated carbon preform was heat-treated at 1550°C under vacuum to obtain SiC ceramics via carbothermal reduction. The ceramics are further characterized by X-ray diffraction (XRD) analysis and field emission scanning electron microscopy (FESEM).

Biography

Nijhuma Kayal has completed her Ph.D. (science) at the age of 26 years from Jadavpur University, Kolkata. She is working as scientist at CSIR-CGCRI from past 13 years. She has published more than 40 papers in reputed journals and is serving as a reviewer of several international journals.

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Synthesis of nanofibers and its applications for the abatement of air pollution

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Different materials at nanoscale are being researched throughout the world for a wide variety of environmental applications ranging from fuel cells, catalysis and photocatalysis, water treatment, so on and so forth. Among them, focus of attention of many researches is nanofibers, since many studies have proved them to be highly efficient for destruction of various pollutants. This study encompasses synthesis of various concentrations of sulphur doped TiO_2 nanofibers using electrospinning method. In order to ascertain the destruction potential of these nanostructures, possibilities of degradation of H_2S gas was explored using photocatalytic experiments. Experiments were carried out under laboratory conditions using capillary glass tube reactor under UV light. Considerable destruction was achieved using S-doped TiO_2 nanoparticles initially, which went on decreasing with increasing sulphur concentrations. XRD, SEM and EDX techniques were used to characterize the fresh and spent (after running the experiments) nanofibers. BioGas Analyser fitted with GPA 1.8 Gas pod was used to determine the destruction of H_2S gas in ppm.

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The influence of chloride contents in sands on reinforcement corrosion

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Reinforcement corrosion in reinforced concrete is one of the most significant problems in assessing the durability of structures. The aim of our study is to determine the vulnerability of the sands on the initiation and propagation of corrosion in reinforced concrete. The effect of chlorides in cylindrical reinforced mortars based on ordinary Portland cement and different content has been investigated with the corrosion behavior of the steel rebar. Corrosion initiation of steel was evaluated through non-destructive electrochemical measurements (half cell potential) versus time of different exposure: with accelerated impressed current technique and natural exposure in the laboratory. The transition from passive to active corrosion was studied considering a potential drop. The results show that despite some sand have admissible levels of chlorides according to the standards, corrosion appeared after a certain time. These results allow to predict the service life of reinforced concrete structures.

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