

CONTENS

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PRODUCING SILICIDE/MOLYBDENUM COMPOSITES BY USING INTERNAL CRYSTALLIZATION METHOD 185

There is shown a possibility to use the internal crystallisation method, which was developed earlier as a base for crystallisation of oxide fibres in a molybdenum matrix, to produce silicide/molybdenum composites. A series of the experiments resulted in obtaining composites with Mo_3Si -based fibres and molybdenum matrix. Composite specimens obtained have microstructures typical for fibrous composites with some peculiarities arisen as a result the particular fibre/matrix system under consideration. The composites are characterized by high creep resistance at temperatures up to 1400 °C. They are to be considered as model ones since at present they do not have sufficiently high fracture toughness properties. The results obtained show ways of designing real metal matrix composites for very high temperature use (p. 185-197; fig. 7).

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SYNTHESIS OF SiC-WHISKERS VIA SOL-GEL TECHNIQUE IN THE BULK OF SiC-CERAMIC 198

Good prospects of the application of the hybrid method for synthesis of nanocrystalline silicon carbide were demonstrated. The method consists of the following steps: sol-gel hydrolysis of tetraethoxysilane in the presence of polymeric source of carbon to form gel; multistage drying; carbonization of the system at moderate temperatures with the formation of superfine, reactive and uniformly distributed « $\text{SiO}_2 - \text{C}$ » mixture; carbothermal synthesis for creation of the reinforcing matrix in the bulk of SiC ceramic material (p. 198-211; fig. 1).

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NANO/MICRO-STRUCTURAL CHANGES ON THE SURFACE OF NUCLEAR FILTERS PRODUCED

FROM THE POLYETHYLENE TEREPHTHALATE FILMS AFTER OZONE-OXYGEN TREATMENT 212

By means of scanning electron and atomic force microscopy, X-ray photoelectron spectroscopy and wettability by distilled water interaction of an electrochemically generated ozone-oxygen mixture with nuclear filters on the basis of polyethylene terephthalate was studied in the gas and water environment. Intensive course of oxidizing destruction processes on the surface and the side walls of the micropores when exposed to either gas or water in the ozone was found, which yields a noticeable increase in their size. It was shown that the wettability changes depended on the mode of the sample handling by ozone-oxygen mixture: in the gas phase the increase in the surface hydrophobicity occurs; in the case of liquid-phase ozonolysis the increase in the hydrophilicity of the surface nuclear filters was observed. The mechanism of destruction of polyethylene terephthalate when exposed to ozone in the gas phase is suggested. In the case of liquid-phase ozonolysis destruction can go on according to the mechanism of alkaline hydrolysis (p. 212-222; fig. 6).

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PREPARATION OF POLYMERIC NANOCOMPOSITES BY USING GRANULATED

MULTILAYER CARBON NANOTUBES 223

A method for preparing polymeric nanocomposite materials by using granulated multi-walled nanotubes (MWCNT) is described. A fabrication technology of the granules and granules-based nanocomposites is disclosed by using as an example two-layered nanotubes. Properties of MWCNT's, their granules, and nanocomposites with epoxy resin ED-20 are described. It is shown that the use of granulated MWCNT in nanocomposites yields a relatively simple technology of materials with high mechanical characteristics (p. 223-229; fig. 7).

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SYNTHESIS OF LEAD DIOXIDE/POLYANILINE COMPOSITES 230

A study of oxidation of aniline by ammonium persulfate in acidic aqueous media in the presence of PbO_2 was carried out. An effect of PbO_2 on the reaction rate, features of polycondensation of aniline and molecular weight of a resulting polymer was studied. Polyaniline - lead dioxide composites were obtained for the first time. Polycondensation of aniline and synthesis of its composites with PbO_2 combined in a single reactor. The method allows obtaining composites with a core of PbO_2 and polyaniline shell, as well as regulating the content of PbO_2 in composites. It was shown that the rate of the polycondensation of aniline increases in proportion of PbO_2 in the reaction medium, and the induction period of the reaction and the molecular weight of polyaniline decreases. Compositions and properties of the obtained products are determined (p. 230-237; fig. 2).

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ASSESSMENT OF EFFECT OF CUTTING ON THE SURFACE QUALITY OF FIBRE REINFORCED

POLYMER SPECIMENS BY USING QUANTITATIVE ANALYSIS OF VIDEO IMAGES 238

When studying effect of cutting technology on quality of surface in the cutting zone, it is found that, in addition to a known type of the defects being flaws and cracks, on the surface there are chipping clearance which also defines surface quality after cutting. Quantitative parameters characterizing the discovered type of defects are determined by a proposed technique of their assessment.

The method of the machine PCM cut quality assessment after processing by cutting when using different types of cutting and cutoff devices by optical microscopy and quantitative analysis of video images using Image Expert Sequencer 4 and Image Expert Pro 3x program packages (p. 238-244; fig. 6).