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Abstracts

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As the result of spent examinations the sequence of the phase transformations in the layered Zr(2 μm) – Fe(10 μm) system was established. The relative content of the phases that are formed in the bulk and in the near-surface layer of the sample was found at each stage of annealing. The process of thermal stabilization of the Fe_3Zr intermetallide at the surface and of the solid solution of α-Fe(Zr) in the bulk of the sample was realized.

THE EFFECTS OF SILICON CARBIDE RATIO AND IRRADIATION DOSE ON BORON CARBIDE-SILICON CARBIDE COMPOSITES

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The wide using area of boron compounds in nuclear technology has generated interest to irradiation effect mechanism in boron compounds. In this study boron carbide-silicon carbide composites were irradiated by electrons. The effects of irradiation on boron carbide-silicon carbide composites were carried out.

Boron carbide-silicon carbide composites were produced by hot pressing method at different boron carbide-silicon carbide ratios. The production realized at 2250 °C temperature under 130 MPa pressure for 2 hours. The ratios of silicon carbide in the composites are up to 40 % by volume.

The boron carbide-silicon carbide composite materials were irradiated by 4 MeV electrons which influence up to 10^{17} cm^{-2} at room temperature.

For the initial and irradiated samples XRD, SEM and EDX analyses were performed. The parameters of crystalline lattices and stresses were investigated for boron carbide and silicon carbide at each dose value and silicon carbide ratio.

The structure features of boron carbide, silicon carbide, were carried out. The effects of dose and titanium diboride ratio on the crystalline lattice parameters and stresses (micro and macro) were discussed. We also discussed possible mechanism of accumulation and evaluation radiation defects by high energy electron irradiation.

THE INFLUENCE OF ELECTRON IRRADIATION ON THE STRUCTURE OF NANOSIZED METAL PARTICLES

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The structure of nano-sized copper powders, before and after irradiation with high-energy electrons in the dose range 1-10 Mrad has been studied using the methods of electron microscopy, small-angle X-ray scattering and X-ray photography. New structural phases with different lattice types and parameters have been detected.

ON THE NATURE OF COLOR CENTERS IN OPTIC FIBERS AT LOW TEMPERATURES

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Short-living and stationary color centers are studied in FVP-300 type optic fibers (OF) with concentrations of OH ~1000 ppm. The studies showed that at room temperatures under irradiation with doses of 10^5 Rad the color centers are not formed. Under γ - irradiation at 77 K one can observe formation of color centers at 215, 260, 330 and 550 nm.

Therefore, we have proposed that under irradiation with 10^5 Rad the color centers corresponding to the non-bridge oxygen atoms are not formed. The research showed that the absorption band corresponding to the absorption of E' - centers (215 nm) disappears in two stages.

The first E' - centers disappear at 85 K, whereas the second one at > 300 K. Here, the first E' - centers disappears by luminescence, and thus in the luminescence spectrum one can see luminescence bands at 470 and 500 nm.

Based on the stated above results, we assume that those centers do appear in the optic fibers at the concentration of OH at 1000 ppm. Thus, new phenomenon was observed at temperatures of 77 - 300 K, i.e. existence of two types of E' - color centers, one of which disappears at temperatures up to

Physical basis of radiation-related technologies