

## PULSED PLASMA CHEMICAL SYNTHESIS OF SIXCYOZ NANOSIZED COMPOSITE POWDER

*GALINA KHOLODNAYA, ROMAN SAZONOV AND DENIS PONOMAREV*

*National Research Tomsk Polytechnic University, Russia  
galina\_holodnaya@mail.ru*

The  $\text{Si}_x\text{C}_y\text{O}_z$  nanosized composite powder with a number-average particle size of 10–50 nm was produced using a pulsed plasma chemical method. The experiments on the synthesis of the nanosized composite were carried out using a TEA-500 pulsed electron accelerator. To obtain the composite,  $\text{SiCl}_4$ ,  $\text{O}_2$ , and  $\text{CH}_4$  were used. Most experiments were done using the plasma chemical reactor (quartz, 140 mm in diameter, 6 liters volume). The reactor was equipped with a manometer, vacuum meter, pressure sensor, shut-off and control valve of initial reactant mixture inlet and pumping out the gas. The initial reactants were injected into the plasma chemical reactor, i.e. the pulsed electron beam which initiated the chemical reactions whose product was the  $\text{Si}_x\text{C}_y\text{O}_z$  nanosized composite powder.

To define the particle morphology, the JEOL-II-100 transmission electron microscope with an accelerating voltage of 100 kV was used. The substances included into the composite nanosized powder were identified using the optical absorption spectrum in the infrared region. To carry out this analysis, the Nicolet 5700 FT-IR Spectrometer was used. The EDX analysis was conducted. Fluorine was distributed uniformly in the powder.

**Keywords:** *nanosized composite powder, pulsed plasma chemical method, pulsed electron accelerator.*