

The synthesis of SiC nanostructures by microwave CVD method

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In the last several years, 1D nanoscale structures including nanowires, nanotubes and nanofibers have drawn great attention due to their potential applications. Among these materials, silicon carbide has interesting physical, chemical, and electronic properties. For this reason 1D silicon carbide nanostructures, which combine excellent internal properties with low dimensions, have great potential.

Silicon carbide nanostructures were synthesized by the method microwave plasma chemical vapor deposition. Iron nanopowders were suspended in ethanol. Next, the solution was treated ultrasonically after which droplets of the suspension with iron nanopowders were applied to a porous silicon substrate.

The synthesis temperature was varied from 600 to 800 ° C with a step of 100 ° C. The experiments were carried out at three values of plasma powers 1600, 1800, and 2000 W. Depending on the plasma power was varied the chamber pressure. The experiments were carried out in the atmosphere of a mixture gases of trimethylsilane ((CH₃)₄Si) and hydrogen, the flow rate of which was 10 and 400 cm³ / min, respectively. Duration of experiments was 120 min.

High resolution field emission electron microscope, Raman spectroscopy and XRD methods were used to investigate the character of these nanostructures in more detail.