SHS 2009

X International Symposium on Self-propagating High-Temperature Synthesis

“Առաջինառանցուղուդների հասարակական գիծը”
X միջազգային գիտական ժամանակաշրջան

Tsakhkadzor, 6-11 July, 2009, Armenia

Book of Abstracts

ORGANIZERS
Combustion synthesis is known to be a source of i.a. novel carbon-related nanostructures like silicon carbide fibres [1], soot [2] and carbon encapsulates containing magnetic nanocrystallites [3]. We present here the results of combustion of different powdered compositions in a modified calorimetric bomb. This technique proved to be very efficient to produce silicon carbide nanowires from Teflon® (polytetrafluoroethylene) and different reductant (CaSi2, Si) mixtures – Fig.1. The effect of process variables (combustion atmosphere, stoichiometry of reactants, etc.) on synthesis yield has been investigated. The protocol to isolate and efficiently purify (above 90 wt%) the final product was proposed [1]. The resulting β-SiC nanofibres, several microns in length and ca. 20-100 nm in diameter, were characterized by using different techniques (XRD, Raman, SEM, TEM, elemental analysis).

The combustion in NaN3-C6Cl6 and NaN3-C2Cl6 systems yielded, after purification, a carbon material which proved to possess interesting physicochemical (selective sorption) and...
electrochemical properties [2]. Carbon nanoencapsulates (ca. 20-60 nm in diameter) containing magnetic nanoparticles were also obtained via combustion synthesis from mixtures Na_Na_3-C_6Cl_5-ferrocene or Na_Na_3-C_6Cl_5-Fe_14Nd_2B [3] – Fig. 2. The effect of combustion atmosphere (N_2-O_2 mixtures) on product compositions and its magnetic properties has been studied.

Fig. 2. TEM images of carbon encapsulates containing magnetic core

Those autothermal processes have inherent advantages, including the use of low cost materials and the simplicity of the production protocol.

This research was partly financed by European Regional Development Fund within the framework of Operational Programme Innovative Economy 2007-2013 (Project No POIG.01.03.01-00-071/08).

REFERENCES