nn09

INFN Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali di Frascati

Nanoscience & Nanotechnology

INFN - Laboratori Nazionali di Frascati
Via E. Fermi 40, Frascati Italy
October 19th - 22nd, 2009

Local Organizing Committee:

S. Bellucci (Director of n&n2009)
F. Micciulla
P. Onorato
F. Rossella
I. Sacco

International Advisory Committee:

L.C. Andreani (Università di Pavia, Italy)
V. Bellani, (Università di Pavia, Italy)
M. Cini (Università Roma Tor Vergata, Italy)
E. Diez (Universidad de Salamanca, Spain)
F. Domínguez Adame (Universidad Complutense, Spain)
P. Galinetto (Università di Pavia, Italy)
J. González (Instituto de Estructura de la Materia, CSIC, Spain)
O. Groening (EMPA Thun, Switzerland)
M. Meyyappan (Ames Nanotech. Center, USA)
M. Pimprikar (CANEUS, Canada)
N. Pugno (Politecnico di Torino, Italy)
L. Sangaletti (Università Cattolica, Brescia, Italy)
U. Valbusa (Università Genova, Italy)
B. Yakobson (Rice University, USA)

Secretariat: colasanti@lnf.infn.it

http://www.lnf.infn.it/conference/nn2009/

"1-D SiC nanostructure formation: looking into 'black box'"

A. Dąbrowska[1], H. Lange[1], A. Huczko[1], S. Cudziło[2]

[1]*Department of Chemistry, Warsaw University, Pasteura 1, 02-093 Warsaw, Poland*

[2]*Institute of Chemistry, Military University of Technology, Kaliskiego 2, 00-908 Warsaw, Poland*

The self–propagating high temperature combustion synthesis (SHS) is an autogeneous chemical reaction in a powdered mixture of a strong reductant and an oxidant. The process, carried out in a modified calorimetric bomb, takes place under far-from-equilibrium extreme conditions so may lead to novel products of new morphology and stoichiometry. In this contribution we present production of nanocombs and 1-D silicon carbide nanofibres (see figure), formed here from different reaction mixtures, e.g., Si/PTFE (Teflon). To learn more about the reaction mechanism and its optimization - which is crucial to precisely control the process and increase its efficiency - we have to enter somehow a 'black box' reaction zone in which all intermediate processes occur. In this study we propose for the first time the spectroscopic techniques to investigate the emission which accompanies the combustion synthesis and because of that constitute potentially an important diagnostic signal. By doing so, we are able to estimate the average combustion reaction temperature and identify the excited reactive species.

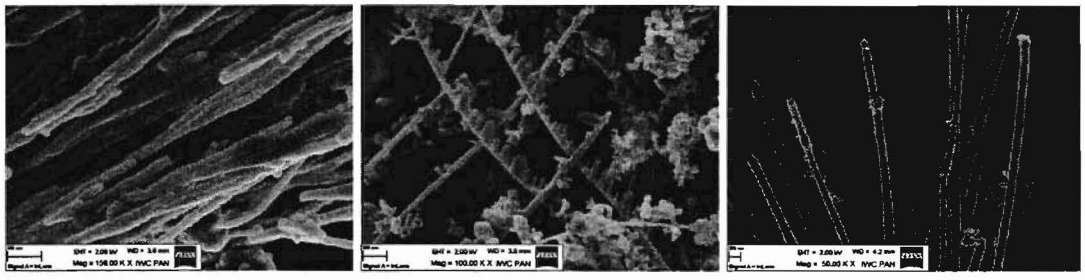

Fig.1 : Examples of products

Acknowledgement. ***This research was partly financed by European Regional Development Fund within the framework of Operational Programme Innovative Economy 2007-2013 (No. UDA-POIG.01.03.01-14-071/08-00).***