PROFILE: CENOBITE PARTNER

INSTITUTE FOR NON-FERROUS AND RARE METALS BUCHAREST, ROMANIA
RESEARCH DEPARTMENT-NANOCERAMIC MATERIALS GROUP

We offer our expertise in synthesis and processing of ceramic nanomaterials
We are interested in cooperation in materials characterisation and applications

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Ceramic group from Research Department, Institute for Non-ferrous and Rare Metals, Bucharest, Romania works in the field of ceramic materials with different applications for about ten years. Its main topics related to nanostructured materials are:

- Wet chemical synthesis of nanocrystalline ceramic powders (co-precipitation, sol-gel colloidal from inorganic precursors, hydrothermal)
- Synthesis of core/shell structured powders
- Development of chemical processing for thin/thick nanocrystalline ceramic films: hydrothermal /electrodeposition processes
- Processing of ceramic and composite powders
- Synthesis of ceramic powders for coatings
- Fundamental studies on the mechanisms and kinetics of the synthesis processes.
- Synthesis of ceramic matrix composite nanomaterials

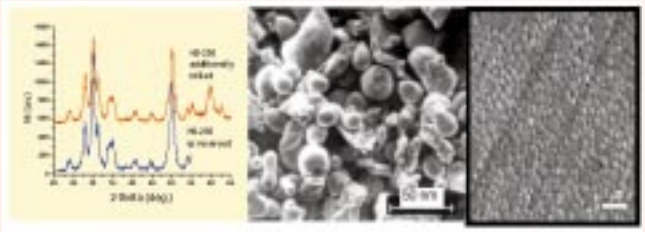
Continuous laboratory plant for coprecipitation and sol-gel reactions:
- glass reactor with mechanical stirrer 30-50 L Duran and Kavalier
- centrifugal separator MLW -S25 Germany

High pressure laboratory hydrothermal/electrochemical system (unique in Europe!) containing:
-autoclave with deposition electrode, counter electrode and reference electrode, capacity 2.2 L, 300°C, digital temperature control, CORTEST, USA-2000
- Potentiostat/Galvanostat VOLTALAB PGZ 100, computer controlled, VOLTAMASTER 4 SOFT, RADIOMETER, France-2000

Laboratory chamber furnace: 1800°C, , RHF 17/3E, CARBOLITE, UK-2000 (left); Vacuum sintering furnace, 2000°C, DEGUSSA, Germany

Other existing research equipments:
- continuous counter current hydrogen furnace, 1100°C
- powder omogenizer, TURBULLA, Sweden
- ball milling, PASCALL Model no.9, England-2001
- digital pH-meters, HANNA Instruments-2001
- hydraulic presses, Japan and Romania

Some important achievements are:
¤ Hydrothermal synthesis processes for high purity, YSZ and YTZP zirconia nanopowders (4 - 22 nm) and films for sensors and fuel cells
¤ Sol-gel colloidal and hydrothermal synthesis processes of doped $BaTiO_3$ ultra disperse ceramic powders
¤ Sol-gel colloidal synthesis processes of Pb (La, Sn) ZT doped ultra disperse ceramic powders
¤ Sol-gel colloidal synthesis of Al_2O_3-ZrO_2
¤ Synthesis of core/shell structured metal / ceramic powders for coatings and sintered compacts
¤ Hydrothermal synthesis of pure and zirconia-doped hydroxy-apatite(HAP) powders



XRD and SEM micrography of YSZ powders and pellets

Metallised piezoelectric sintered pellets

1. Roxana Mioara Piticescu, M.Preda, D.Taloi, V.Badilita, "PLSnZT nanoceramics obtained by a sol-gel colloidal process", Brit. Ceram. Proc. no.60, The 6th Conf. Euro Ceram. Soc., 20-24 June 1999, pp.239-240;
2. Roxana M. Piticescu, M.Popescu, Aurelia Meghea, "Synthesis of PLSnZT ceramics with large displacement constants via a sol-gel colloidal process", Int. J. of Mat. and Product Technol.", ed. by Interscience Enterprises Limited, vol.15, Nos.3/4/5, pp.260-269 (2000)
3. R.R. Piticescu, C. Monty, D. Taloi A. Motoc, S. Axinte, "Hydrothermal synthesis of zirconia nanomaterials" J. Eur. Ceram. Soc., Vol. 21, no.10-11, 2001, pp. 2057-2060
4. C. Georgescu, R. Piticescu, C. Monty et al." Yttria doped zirconia based nanoceramics: preparation, characterisation and oxigen transport properties" Int. Conf. On Nonstoichiometric Ceramics and Intermetallics, 2001, Barga, Italy
5. R.R. Piticescu, B. Malic, C. Monty, "Synthesis and sintering behavioue of hydrothermally synthesised YTZP nanopowders for ion-conducting applications", Electroceramics VIII, 25-28 August 2002, Rome, abstract book p. 139 (to be published in J. Eur. Ceram. Soc)
6. C. Monty, F. Sibieude, R. Piticescu, A. Motoc, B. Malic, M. Kosec, G. Petot-Ervas, "Preparation and ionic transport properties of yttria-doped zirconia nanomaterials", Electroceramics VIII, 25-28 August 2002, Rome, abstract book p. 143 (to be published in J. Eur. Ceram. Soc)
7. R.R. Piticescu, R. M. Piticescu, D. Taloi, "Modelling hydrothermal synthesis of ceramic nanocomposite powders", Eur. Mater. Soc. Conf. Varsovia, 15-18 sept. 2002 to be published in J. Solid State Reactions)

Different equipments for chemical and structural characterisation:
- ICP spectrometer, SPECTROFLAME
- DERIVATOGRAPH-C, MOM, HUNGARY
- Gas analyzer in solid samples, LECO NT 15
- SEM TESLA BS 3, Czech Republic
- Optical microscope, EPIQUANT, Germany
- XR diffractometer

PARTICIPATION TO INTERNATIONAL CONTRACTS:
- NATO SfP 974054 "Zirconia Nanomaterials"
- European Network "Polar Electronic Ceramics" (POLECER)
- European Project GRD1-99-1-1008V-1 "Microscale fabrication of functionally graded materials"

The Ceramic Group is member of Romanian Network of excellence in Nano-bio-technologies (CENOBITE).

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