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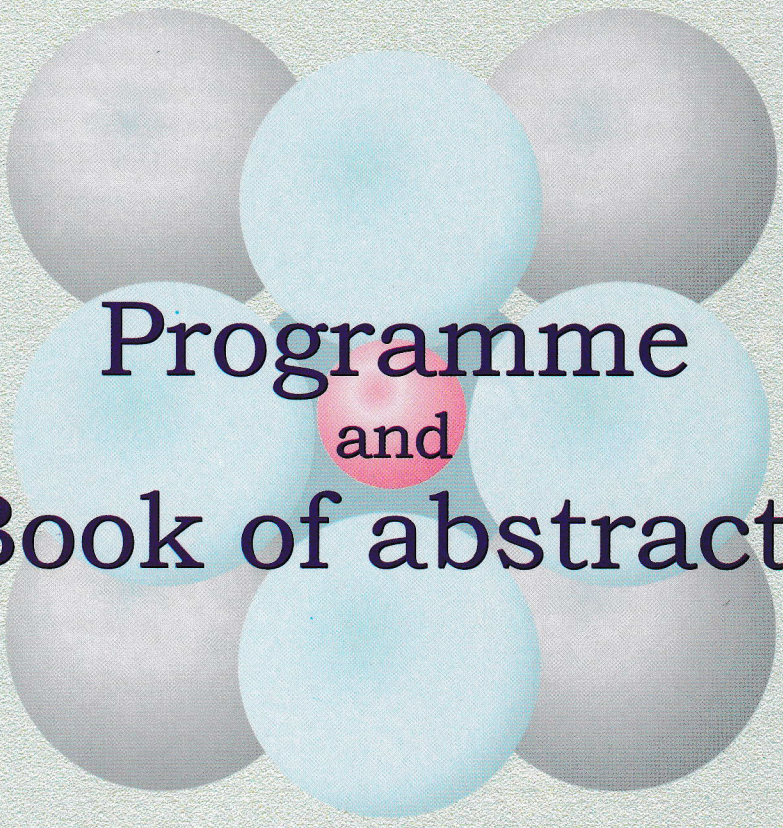
COST 539 Action – ELENA



Programme and Book of abstracts

2nd Workshop

Processing and Characterization of Nanostructured Systems

November 15–16, 2006
Brussels, Belgium

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Programme and Book of Abstracts of 2nd Workshop COST 539
Processing and Characterization of Nanostructured Systems

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Preface

The synthesis of nanomaterials
fination is a subject of intensive r
fundamental scientific interest as wel

In recent period participating t
jects the scientist put strong effort t
procedures for the synthesis of elec
improve their quality for specific ele

The improvements in this field
field obviously touches issues of s
politicians and organisational inte
to bring together groups in many
nanopowders synthesis and proces
on together earlier.

In previous period there wa
powder synthesis by innovative n
common multidisciplinary interest
technological sectors, or repres
technology.

The 2nd Workshop of COST
zation of Nanostructured Systems
539 Meetings that were held in C
and in June 2006. in Toledo, Spa
presented results, as well.

Thursday, November 16 – Morning

SESSION 6 (10.20 – 12.15)
CHAIR: J. Banys, K.V. Rao

10.20 – 10.45 COST-I-06 INVITED
CHARACTERIZATION OF ELECTROCERAMICS AT THE MACROSCOPIC SCALE TO THE NANOSCALE
R. Freer, F. Azough, C. Leach, R. Cernik
Materials Science Centre, School of Materials, University of Manchester, Manchester, UK

10.45 – 11.00 COST-O-23
NANOSTRUCTURED TiO_2 AND ZnO BASED HYBRID MATERIALS
H. Van den Rul[1,2], I. Truijen[1], J. Beusen[1], I. Haeldermans[1], K. Elen[1], N. Lepot[1,3], J. Manca[4], R. Peeters[3], D. Franco[3], M.K. Van Bael[1,2], J. Mullens[1]
[1]*Universiteit Hasselt, Institute for Materials Research, Inorganic & Physical Chemistry Group, Diepenbeek, Belgium*
[2]*IMECvzw division IMOMEC, Diepenbeek, Belgium*
[3]*XIOS Hogeschool Limburg, Verpakkingscentrum, Universitaire Campus, Diepenbeek, Belgium*
[4]*Universiteit Hasselt, Institute for Materials Research, Materials Physics Group, Diepenbeek, Belgium*

11.00 – 11.15 COST-O-24
THE ROLE OF $(Fe'_{Ti} - V_O^{\bullet\bullet})^{\bullet}$ FUNCTIONAL CENTERS IN NANOSCALE FERROELECTRIC $PbTiO_3$ POWDERS – MICROSTRUCTURE AND DEFECT CHEMISTRY
R.-A. Eichel[1], H. Hahn[2], V.V. Srdic[3]
[1]*Eduard-Zintl-Institut, Darmstadt Technical University, Germany*
[2]*Research Laboratoy Nanomaterials, Insitute of Materials Science, Darmstadt Technical University, Germany*
[3]*Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Serbia*

11.15 – 11.30 COST-O-25
STRUCTURAL REFINEMENT IN EUROPIUM-DOPED-GADOLINIA NANOCRYSTALLINE POWDER
O. Milosevic[1], L. Mancic[1], L. Gomez[2], M.E. Rabanal[2]
[1]*Institute of Technical Sciences of SASA, Belgrade, Serbia*
[2]*University Carlos II, I Materials Science and Engineering Dept., Leganes, Madrid, Spain*

11.30 – 11.45 COST-O-26
EFFECT OF POWDER SYNTHESIS ON CRYSTAL AND MICROSTRUCTURE OF $BaTiO_3$
M.M. Vijatovic[1], M.A. Zaghete[2], M.R. Vasic[1], Lj.M. Živkovic[3], B.D. Stojanovic[1]
[1]*Center for Multidisciplinary Studies University of Belgrade, Belgrade, Serbia*
[2]*Instituto de Quimica, UNESP, Araraquara, Brazil*
[3]*Faculty of Electronic Engineering, University of Nis, Nis, Serbia*

COST-O-26

EFFECT OF POWDER SYNTHESIS ON CRYSTAL AND MICROSTRUCTURE OF $BaTiO_3$

M.M. Vijatovic[1], M.A. Zaghete[2], M.R. Vasic[1], Lj.M. Živkovic[3], B.D. Stojanovic[1]

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Barium titanate ($BaTiO_3$) has been used in many applications such as multilayer capacitors, piezoelectric ceramics, transducer devices, PTC resistor and has become one of the most important ferroelectric ceramics. It is used extensively in ceramic capacitors, due to its high dielectric constant and low loss characteristics.

Barium titanate was prepared by two methods, polymeric organometallic precursors process and mechanochemicaly. X ray and SEM were used for caracterization of powders and sintered samples. In both ways of synthesis the formation of cubic phase is obtained. It can be observed that in the case of Pechini process $BaTiO_3$ powder is well crystallized but in the case of mechanochemistry process, significant amount of amorphous phase was detected. The sintered samples at 1300°C for 2h, prepared by Pechini process, shows the formation of tetragonal phase. The morphology of the powders consists of particles and its agglomerates, their dimensions depend of the synthesis method. The powder prepared mechanochemicaly posses more anglomerates. The particles are bigger and with iregular shape. Average particle size is about 100 nm and 250 nm for Pechini and mechanochemical process, respectively. In sintered samples, prepared by Pechini process, at 1300°C for 2h is observed two types of domain configuration. The wall thickness ranges from 0.08 μm up to 0.14 μm and from 0.14 μm up to 0.17 μm for 90° and 180° domains respectably. The domain width is around 0.20 μm for both types of domains.

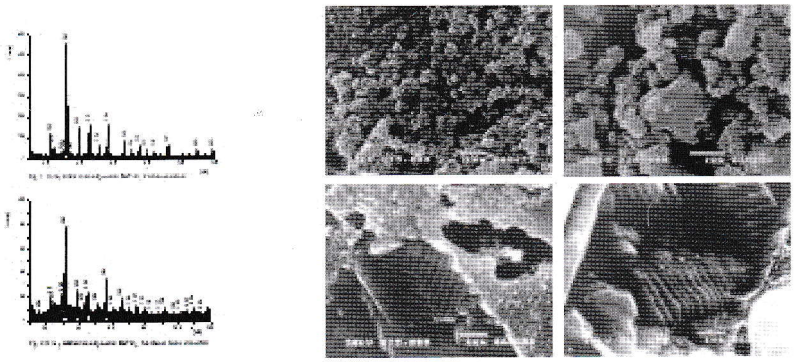

Figure 1. X ray difraction of $BaTiO_3$ powderes obtained by Pechini proces and mechanochemically and SEM photographs of both powders and domain structure of sintered samples by Pechini process.

References

[1] W-S. Cho, E. Hamada, *J. Alloys and Compounds*, **266** (1998) 118–122.
[2] B. D. Stojanovic, *J. Mater. Processing Technology*, **143–144**, (2003) 78–81.