Centre for Functional and Surface Functionalized Glass

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FUNDAMENTAL RESEARCH

- modeling of formation and relaxation of mechanical stresses in glass
- relations between glass composition, structure and properties
  - corrosion and leaching kinetics of glass
- electrochemical processes in glass forming melts
- direct observation of processes in glass melts
- identification of inhomogeneities in glass

APPLICATIONS

ALLUMINATE GLASS CERAMIC PHOSPHORS

- aluminophosphate for energy efficient lighting (Hi-LED)
- rare earth (Er, Nd, Yb) doped aluminophosphates
- microspheres prepared by flame synthesis
- replacement of RE by transition metals (d-elements)
- reduction of EU dependency on raw materials’ import

CORROSION RESISTANT MATERIALS

Need for highly corrosion resistant materials:
- to liquidate toxic waste (SCWO units)
- to exploit geothermal energy
- to develop highly durable materials for automotive and power plant industry

Study and testing of corrosion:
- silicon nitride based structural ceramics
- polymer derived ceramics in ternary systems (SiC, SiN) in hot aqueous media at 250 - 400°C

HOLLOW GLASS MICROSPHERES

- mechanical properties enhancing fillers in polymers
- fillers for various organic and inorganic applications
- fabrication of lightweight composite materials
- thermal insulation materials and materials for gas storage
- in situ radiotherapy treatment with yttrium containing glass microspheres

CORROSION AND PROPERTIES OF DENTAL MATERIALS

- mechanisms of corrosion and low temperature degradation of materials for dental replacements
- influence of dietary habits on degradation of natural teeth
- evaluation of influence of corrosion on mechanical properties of dental materials

CULTURAL HERITAGE PROTECTION

- chemical analysis and compositional mapping of historical glass and ceramics by ICP MS coupled with laser ablation
- corrosion studies of historical glass
- glass weathering by chemical and physical properties environmental factors
- identification of corrosion deposits on glass historical objects

Degradation of historical glass due to weathering conditions (iridescence)
Corrosion of Cu-meta/glass joints in acetic vapours

Yttrium aluminium garnet hollow glass microspheres prepared by flame synthesis.