QUESTIONNAIRE

(*) – mandatory fields

	Details about organisation
* **Organisation name**	Agladze Institute of Inorganic Chemistry and Electrochemistry
Organisation acronym	
* **Organisation Activity** Type (**RES** - Research, **HE** - University, **SME** - Small and Medium Enterprise, **IND** - Industry, **OTH** - Other)	RES
* **Keywords of main research areas**	Electrochemistry, Inorganic Chemistry, Physical Chemistry, Chemical physics
* **Head of organisation (first name, family name)**	Grigor Tatishvili
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* **Description of organisation and its research achievements for the last five years (~ 5000 signs)**
The important investigations were carried out in the fields of thermochemistry, theory of the charge transfer in condensed systems, electrochemistry of melts; radiation chemistry etc. Institute of Inorganic Chemistry and Electrochemistry has 12 scientific laboratories. It currently employs just over 100 doctorate-level (PhD and Dr.Sc.) researchers. Facilities include experimental workshops. **Institute's focus** Institute's areas of core competencies include the following: • Elaboration of scientific principles of rational technologies for treatment of Georgian mineral raw materials and obtaining of new materials. • Elaboration of scientific principles of new membrane and nanotechnologies. • Elaboration of the new up-to-date research methods for ecology safety and medicine. Among other important areas of research are: • mining and processing of manganese, arsenic, copper, barium, coke; • electrochemical kinetics and thermodynamics; • processes of dissociation of biologically active organic acids;

- power sources and electrode materials;
- radiation chemistry;
- catalysis;
- electro-crystallization;
- non-aqueous electrochemistry;
- optical spectroscopy;
- coordination compounds etc.

Recent investigations explore research opportunities in hydrogen and solar power generation, corrosion-resistant coatings, and using uranium filters for water purification.

	Contact Information
* **Contact person (first name, family name)**	Tamaz Marsagishvili
* **Department / Laboratory**	R.Dogonadze Theoretical research Dept.
* **Position**	Head of Dept.
* **Qualification and research experience**	Dr.Sci., Electrochemistry, Chemical physics
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International co-operation / Participation in EU RTD programmes or other bilateral / multilateral actions

INTAS, TACIS, TEMPUS, COST, EUREKA, other RTD programmes (please specify programme/s, project title/s and year/s

1. "**Charge phototransfer processes".** 1998-1999**.** INTAS Foundation, Project INTAS 96-1162, Royal Institute of Technology, Sweden

2. " Direct synthesis of novel complex compounds with valiable properties from military equipment that is subject to conversion" . 2000-2002 . GGrant STCU GR-32-J

3. "**Development of Newest Methods and Optochemotronic Sensors for Liquids Assays on a Base of Electrochemiluminescent Molecular Condensed Langmuir-Blodgett Films with New Electrochemiluminescers",** 2005-2007. Grant STCU GR77.

4. "**Novel radiation-resistant composite chalcogenide and chalcogen halide materials for electronic, optoelectronic and nonlinear equipment'** 2004-2005. STCU Foundation, Project GR91.

5. "**Design of Amorphous Manganese-Dioxide-Based Composite Materials for Waste Water Purification",** 2003-2005 STCU Foundation, Project GR85,

6. "**Development of Synthesis Techniques and Industrial Technologies of Production of Materials for reaction vessels of Lithium power sources"**. 2004-2005. STCU Foundation, Project GR83 .

7. "**Development of new method for production potassium permanganate".** 2004-2005. GRDF 062-4007-TB-04

8. "Development of new method for production potassium permanganate and its pilot industrial test." 2005-2006 GRDF GEO-1-4014-TB-05

9. "Development of Technology for Production of High Purity Manganese Carbonate from Industrial Wastes and Sludge". 2007 . GRDF BPGN08/)7

	* Please, use "X" to indicate the scientific area/s of your potential project
CHEMISTRY	+
SOCIAL AND HUMAN SCIENCES	
ECONOMIC SCIENCES	
ENGINEERING SCIENCE	+
ENVIRONMENT	+
AGRICULTURE AND FOOD	+
HEALTH	+
MATHEMATICS	
INFORMATION SCIENCE	
PHYSICS	+
NANOTECHNOLOGIES	+
ENERGY	+
TRANSPORT	
SPACE	

*** Summary of potential research project envisaged hosting of European researcher for the period of between 1 and 2 years**

Application of hydrogen as a fuel for transport may become, in the near future, a solution of ecological problem of big towns - contamination of environment, first of all, of air. For production of sufficiently cheap hydrogen for its use as a fuel, it is necessary to have a source of cheap and - it is desirable - renewable energy.
Georgia has a big potential of production of cheap electric energy (hydro, solar, wind, thermal, etc.) which makes this region perspective for development of hydrogen power engineering.
Application of solar energy for hydrogen production may be considered as one of the most promising directions of power engineering. Most widespread experimental systems working on application of solar energy are semi-conductor converters for obtaining of electrical energy and heaters for obtaining of hot water. Application of

obtained electrical energy for hydrogen production is not difficult. The main disadvantage of such systems is high cost of equipment owing to high cost of semi-conductor converters and low coefficient of transformation of solar energy into electric energy and correspondingly into hydrogen.

Hydrogen production is possible with the help of thermal water decomposition process for which solar energy may be used as the source of heat. Obtaining heat with the help of mirrors and concentrators is much cheaper and more effective than obtaining electrical energy by semi-conductor converters. Thermochemical water decomposition and obtaining hydrogen by such a method as a result may be much more accessible from economic viewpoint.

The goal of the given project is development of scientific fundamentals and selection of cycles of chemical and electrochemical processes for thermo-chemical obtaining hydrogen from water with application of solar energy.

Information on optical systems, which allow solar energy concentration on the surface of reactor's active zone and raising the temperature to the necessary level, will be analysed. Theoretical models for all suggested process cycles working on thermochemical water decomposition will be worked out. Thermodynamic parameters will be calculated for all chemical transformations of these cycles. The cycles which are possible from thermodynamic point of view will be selected on the basis of calculations. Theoretical and experimental investigations will be carried out for all selected systems, first of all kinetic, for all investigated chemical and electrochemical systems. The best system will be selected on the basis of analysis of obtained data. This system will be additionally investigated, with the aim of obtaining experimental data, necessary for the control of separate stages of the processes. Selection of the best system will be conducted, first of all, on the basis of economic and ecological evaluations. Laboratory equipment for realization of separate stages of the processes will be produced. This will allow to collect data for building of pilot equipment.

Marketing investigations on possible users of thermochemical technology of obtaining hydrogen will be conducted.

	Please, confirm your agreement on data publication and dissemination
I agree with the publication of the data on the web-site **http://www.inco-eeca.net**, and **dissemination** among Mobility National Contact Points of the EU MS and AC **(YES / NO)**	Yes
Date	10.12.2008