

Background

Glass as a material:

- + Hygienic
- + 100 % recyclable
- + Low cost raw materials
- + Good domestic raw materials' base
- Energy intensive production
- Move of production to Asian countries



Centre for functional and surface- functionalized glasses (FunGlass)

**Horizon 2020 programme
Call WIDESPREAD 1-2014: Teaming**

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Solution

Glass with high added value:

- Glasses with functional properties for advanced applications
- Surface functionalized glasses
- Utilization and recycling of communal and industrial waste for production of special glasses

Applications



Surface functionalization

- **Energy efficient buildings:**
 - ✓ reflection, and anti-reflection coatings of glass panels
 - ✓ high strength construction elements
- **Automotive:**
 - ✓ hydrophylic/hydrophobic/self-cleaning glasses
- **Health care:**
 - ✓ antibacterials/self-cleaning coatings (MRSA)
 - ✓ bioglass for personalized health care
 - ✓ controlled delivery and release of drugs
- **Energy:**
 - ✓ production (PV)
 - ✓ saving (energy efficient lighting)



**Intensive and coordinated
research activities needed**

Project objective



Upgrade of the existing Centre of excellence for ceramics, glass and cement in Trenčín, Slovakia, (CEKSiM) to an internationally recognized Centre for functional and surface-functionalized glasses.

Specialization:

- ✓ cutting edge research of glasses with special functional properties (luminescence, electric, sorption),
- ✓ surface functionalization of conventional glasses, modification of their properties, adding new functionalities.

CEKSiM



Joint venture of 3 partners:

- ✓ Alexander Dubček University of Trenčín
- ✓ Institute of Inorganic Chemistry, SAS
- ✓ Institute of Materials Research, SAS

Location:

Premises of TnUAD in Trenčín

Personnel:

15 researchers + 16 PhD students

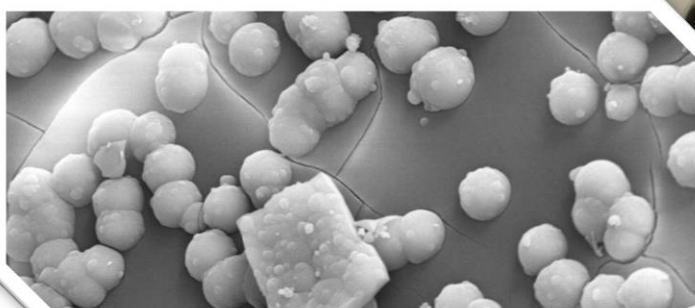
The Centre is NOT a legal entity



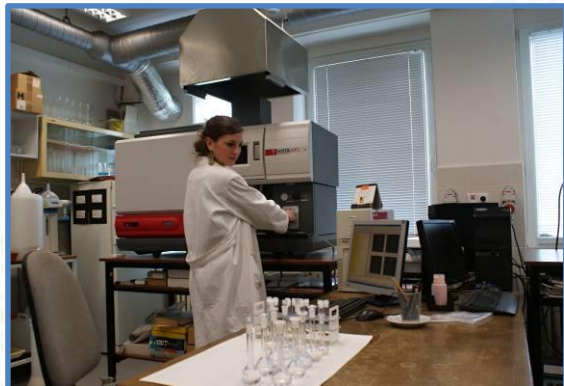
CEKSiM: research



- Relations among glass composition, structure and properties
- Development of new industrial glasses
- Corrosion and leaching kinetics of glasses
- In situ observation of glass-forming melts and electrochemical processes in melts
- Modeling of formation and relaxation of mechanical stresses in glass
- Aluminates glasses with photoluminescent properties



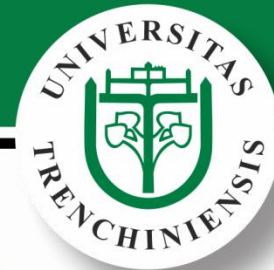
Infrastructure



Investments in the last 6 years ~ 6M€



Partners



Leading institutions of glass research in Europe:

- ✓ Universität Erlangen-Nuernberg, Germany
- ✓ Otto-Schott Institut, Universität Jena, Germany
- ✓ Instituto de Ceramica y Vidrio, Madrid, Spain
- ✓ Università degli Studi Padua, Italy

Leading scientists in the field

	Cited	H-index
Prof. A.R. Boccaccini	10322	54
Prof. L. Wondraczek	1017	21
Prof. A. Durán	4697	36
Prof. P. Colombo	2399	32

Compliance with RIS3 strategy



Areas of specialization:

- ✓ 1 research of materials and nanotechnology
- ✓ 5 Sustainable energy



glass and glass-ceramic based materials and surface modified materials with new functionalities

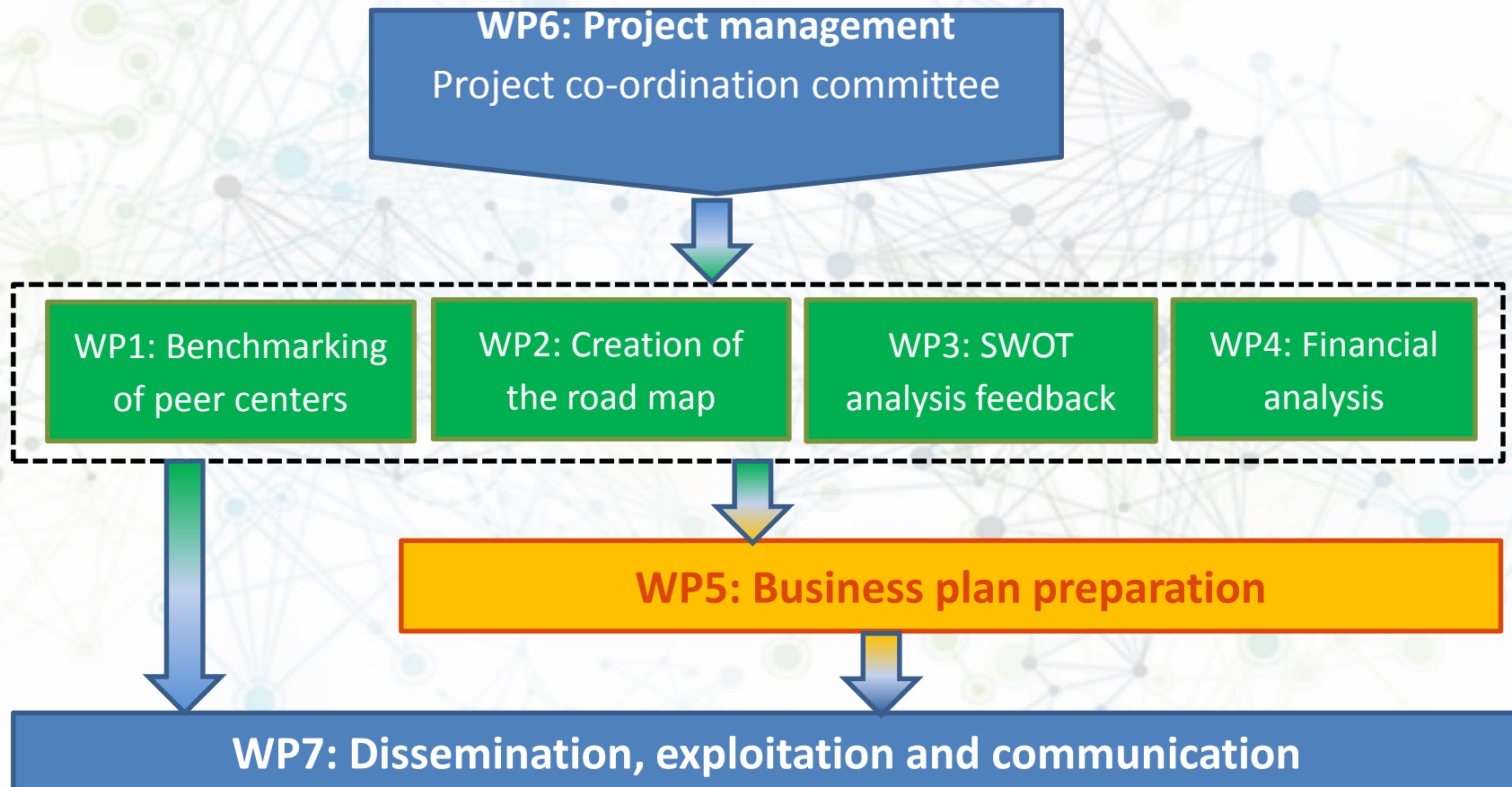
- ✓ Partially 3 :  materials for personalized health care

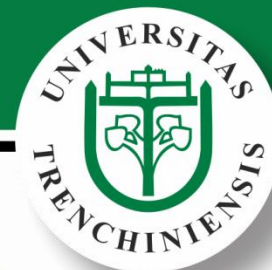
Development trends based on the available R&I capacities

- ✓ trend 1 – new materials,
- ✓ trend 6 - development of technologies for obtaining electricity and heat from renewable sources (water, sun, wind, biomass),
- ✓ trend 7 - research in nuclear energy with a focus on safety, storage of spent fuel.

Means to achieve the objectives

Short term: CSA action





Time schedule: CSA action

WP	Month											
	01	02	03	04	05	06	07	08	09	10	11	12
WP1		V1-1	V1-2	V1-3	V1-4	R1-1						
WP2						R2-1						
WP3			R3-1									
WP4		M4-1				R4-1						
WP5												R5-1
WP6	M6-1					R6-1	M6-2					R6-2
WP7	DEC7-1			DEC7-2								DEC7-3



Impact of the CSA action

- Create prerequisites for significant upgrade of CEKSiM, building partnership with high performing countries.
- Preparation of robust business plan:
 - ✓ long term science and innovation strategy of the new Centre,
 - ✓ detailed provision for good management,
 - ✓ involvement of leading scientists from EU.
- Institutionalization of partnership
 - ✓ Improvement of chances to seek competitive funding
 - ✓ Improvement of chances for participation in industry-driven innovation activities.
- Preparation of the ground for:
 - ✓ transfer on knowledge and know-how in the field
 - ✓ sound management of the new Centre,
 - ✓ significant improvement of its research and innovation culture.

Means to achieve the objectives



Long term: FPA action

CSA	
preparation of business plan	Start + 12 months
FPA	
Establishment of the Centre and its structures	Start + 18 months
Management system for advanced research facilities	Start + 18 months
Student and researcher exchange programs	Start + 18 months
Building of the premises, procurement of research infrastructure	Start + 36 months
Hiring of research and administration staff	Start + 36 months
Completion of training of the research staff	Start + 48 months
International graduate school issuing joint diplomas	Start + 72 months
Achievement of financial self-sufficiency	End + 36 months

Expected impact of the FPA action



- **Regional level**
 - ✓ Establishment (upgrade) of the research Centre
 - ✓ Personnel
 - ✓ Funding
- **National and EU level**

Expected impact of the FPA action



Centre establishment:

Establishment of the Centre for functional and surface functionalized glasses and ensuring its long term sustainability by:

- ✓ building and upgrade of its research infrastructure,
- ✓ involvement in cutting edge research and innovation activities
- ✓ involvement in industry-related research,
- ✓ introduction of the sound management of the new Centre,
- ✓ improvement of its research and innovation culture.

Expected impact of the FPA action



Personal policy

- Creation of 20-25 new workplaces for:
 - ✓ skilled and qualified research personnel
 - ✓ auxiliary and administration staff
- Ensuring excellent quality of the personnel:
 - ✓ creation of mechanisms and financial conditions for hiring high quality research personal from abroad,
 - ✓ intensive training through student and researcher exchange programs
 - ✓ access to research facilities of the partners
 - ✓ interim training sessions of Slovak specialists on advanced research facilities of the partners.

Expected impact of the FPA action



Funding:

Achievement of financial self-sufficiency of the Centre through:

- ✓ Participation of the present day partners of CEKSiM at the activities of the new Centre,
- ✓ Sufficient number of research grants from national and international sources,
- ✓ Contracts with industrial partners,
- ✓ Service measurements for industrial partners,
- ✓ Revenues from sold patents and technologies.



Expected impact of the FPA action

National and EU:

- ✓ Achievement of international scientific and innovation excellence,
- ✓ Support of competitiveness of European industries,
- ✓ Generation of know-how for technologies and materials with:
 - High innovation potential,
 - High added value,
- ✓ SMEs and spin-offs utilizing the research outputs of the Centre



Thank you for your attention

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