

Opportunities for development of advanced materials in circular economy

National Institute of Chemistry

Dr. Barbara Tišler

Head of the project office



NATIONAL INSTITUTE
OF CHEMISTRY

advanced materials in circular economy



Brussels, 2.12.2015
COM(2015) 614 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Closing the loop - An EU action plan for the Circular Economy

1. Production

A circular economy starts at the very beginning of a product's life. Both the design phase and production processes have an impact on sourcing, resource use and waste generation throughout a product's life.



advanced materials in circular economy



Responsible

Green

Bio-based

Sustainable



Smart Specialisation Strategy of Slovenia

20. 9. 2015

Priority Areas

- Smart Cities
- Smart Buildings
- Circular Economy**
- Functional Foods
- Tourism
- Factories of the future
- Health, Medicine
- Mobility
- Materials as end products



2016

- **Projects**
- **Strategic Research and Innovation Partnerships**

To come

- **Projects**
- **Infrastructure**





Projects



erc
European Research Council

PLOTINA
Promoting gender balance and inclusion in research, innovation and training

NanoRestART

HORIZON 2020
OBEUCS

fwo
Opening new horizons

Interreg SLOVENIJA - AVSTRIJA
Evropski sklad za regionalni razvoj
RETINA

HELI

M-era.Net
MEDISURF

ADREM
Adaptable Reactors for Resource- and Energy-Efficient Methane Valorisation

MarineBiotech

TOLLerant
at the heart of immunity

Interreg ITALIA-SLOVENIJA
BIOAPP

ICGEB

LiRichFCC

M-era.Net
WABASELCOAT

HORIZON 2020
LightDyNamics

ERA
SynBio

EUROPEAN DEFENCE AGENCY
RUPUNIT

in3
integrated in vitro & in silico tools

CO₂

NATO
OTAN

Interreg ADRIAN
ADRIATIC-IONIAN
European Regional Development Fund - Instrument for Pre-Accession II Fund
BIO ECO RD

M-era.Net
GRAFOOD

next BioPharm DSP

Interreg CENTRAL EUROPE
BIOCOMPACK-CE

W

FReSMe

Projects

FReSMe, From Residual Steel Gasses to Methanol, 2016.



ADREM, Adaptable Reactors for Resource- and Energy-Efficient Methane Valorisation, 2015.



MefCO2, Synthesis of Methanol from Captured Carbon Dioxide Using Surplus Electricity, 2014.



MAR3BIO, Biorefinery and biotechnological exploitation of marine biomasses, 2016.



RHODOLIVE, Biovalorization Of Olive Mill Wastewater To Microbial Lipids And Other Products via Rhodotorula Glutinis Fermentation , 2017.



advanced materials in circular economy



300 employees

130 researchers with PhD

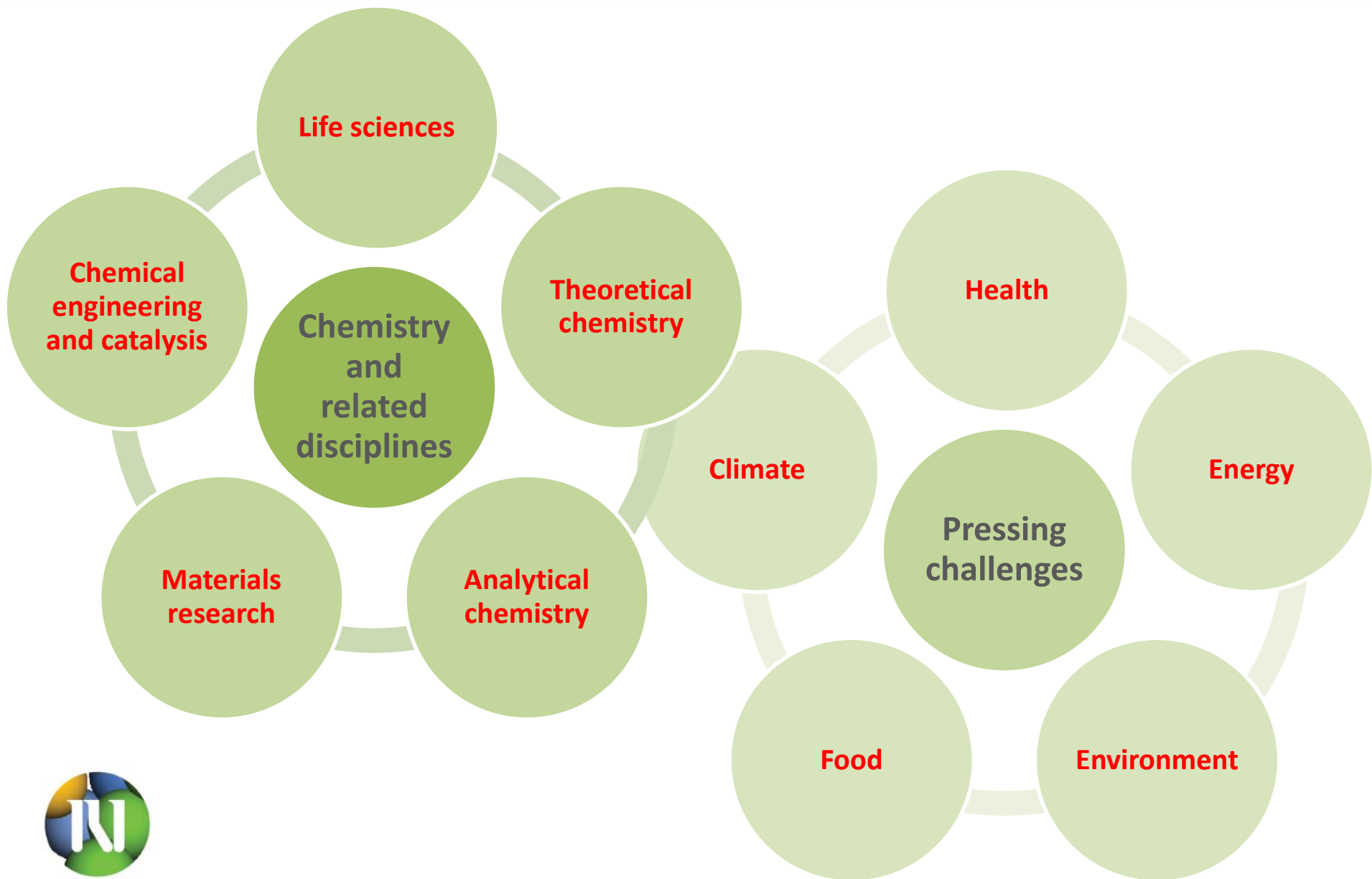
66 PhD students

in expanding knowledge of chemistry and associated studies

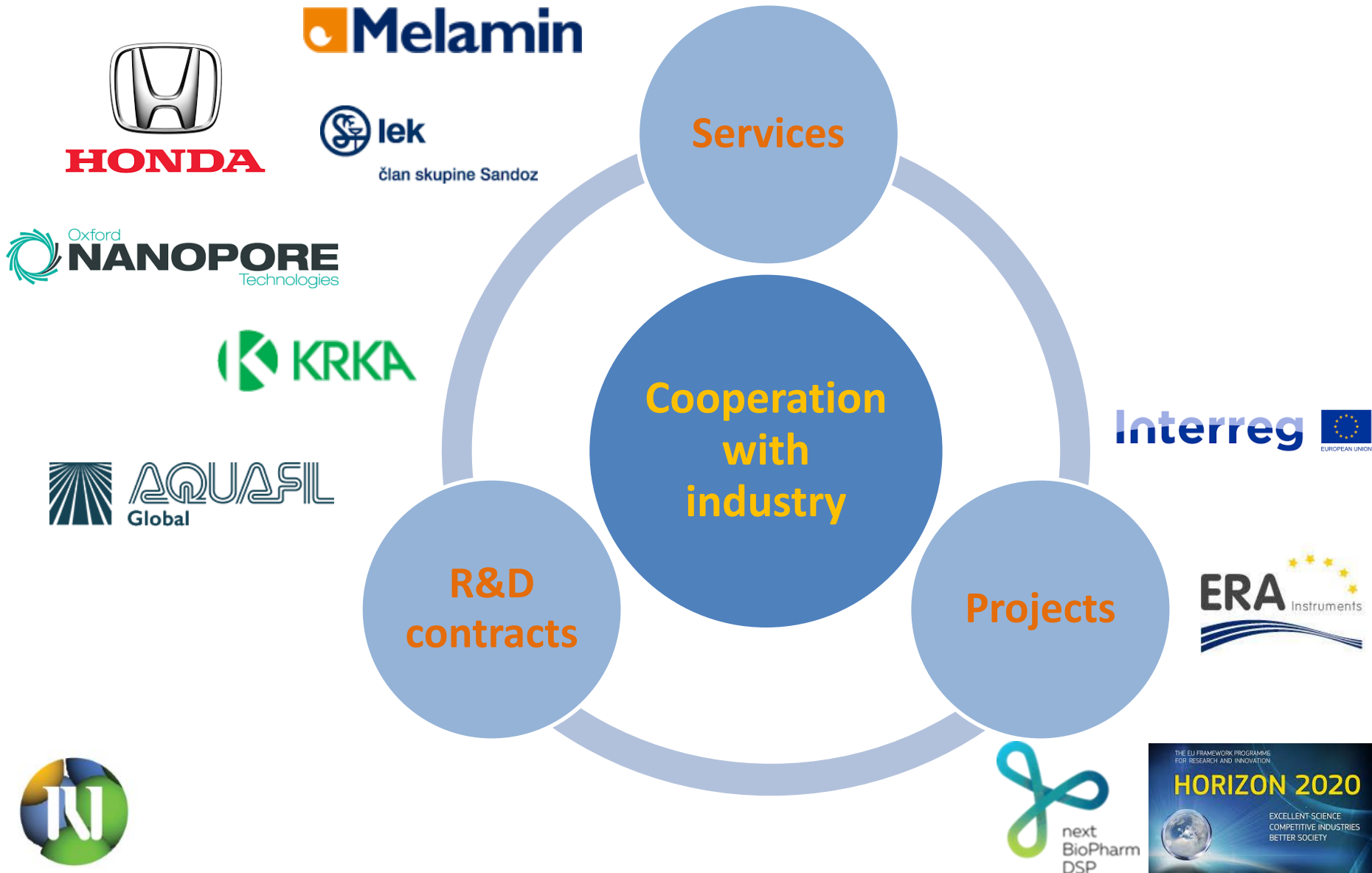
in transferring knowledge to younger generations

in applying newly acquired knowledge to industry

advanced materials in circular economy



advanced materials in circular economy



advanced materials in circular economy



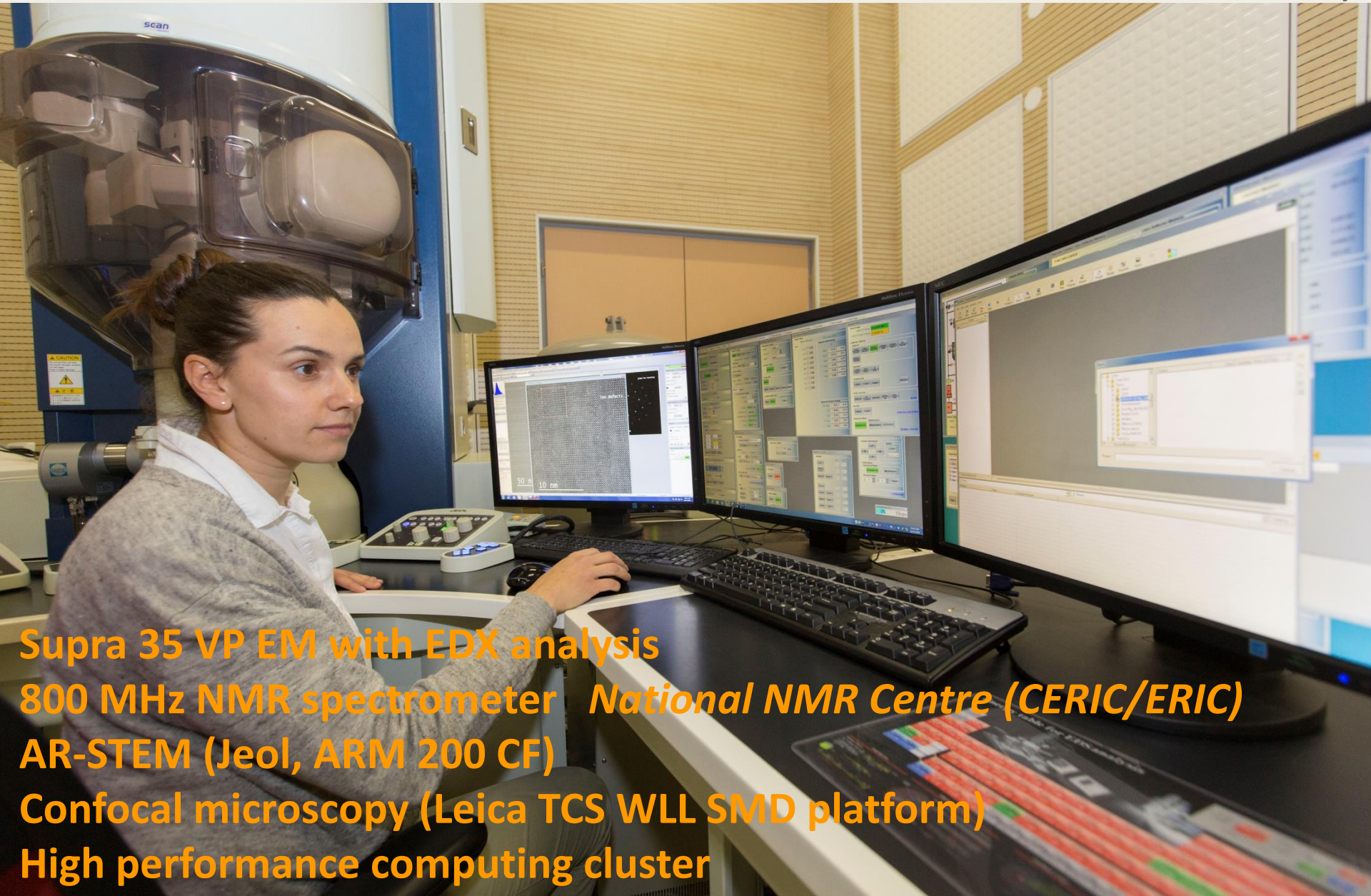
PREGL RESEARCH CENTER

10 Mio EUR

3800 m²

Finished 2013

advanced materials in circular economy



Supra 35 VP EM with EDX analysis

800 MHz NMR spectrometer *National NMR Centre (CERIC/ERIC)*

AR-STEM (Jeol, ARM 200 CF)

Confocal microscopy (Leica TCS WLL SMD platform)

High performance computing cluster

advanced materials in circular economy



Responsible

Green

Bio-based

Sustainable



Responsible Research and Development

ADVANCED MATERIALS

Materials for energy storage and conversion

(bio)catalytical materials, graphene, nanoparticles, microporous materials, raw materials

Biomimetic nanomaterials

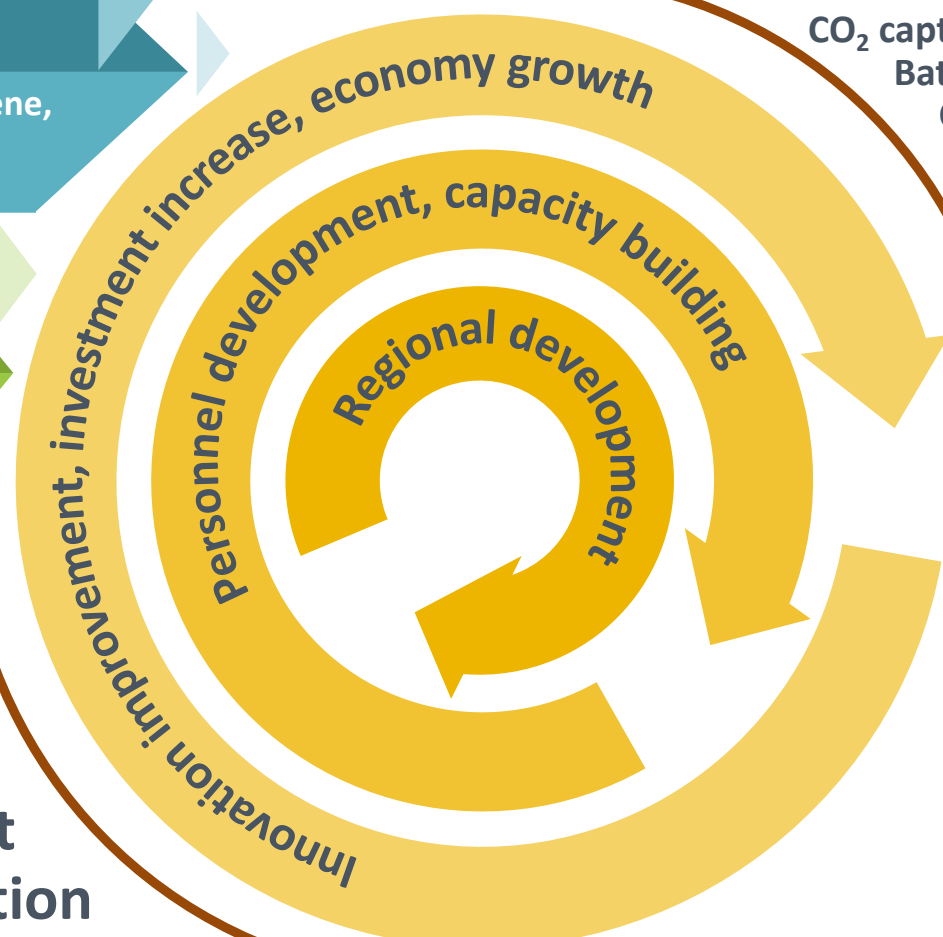
foldamers, polypeptide networks, nanopores, bionanostructures

Modelling

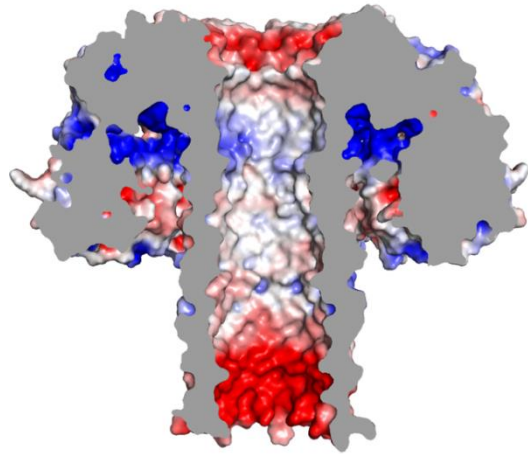
APPLICATIONS

CO₂ capture and conversion
Batteries
Coatings
Drug delivery
Vaccines
Sensors

Research
Training
Innovation
Pilot
Demonstration



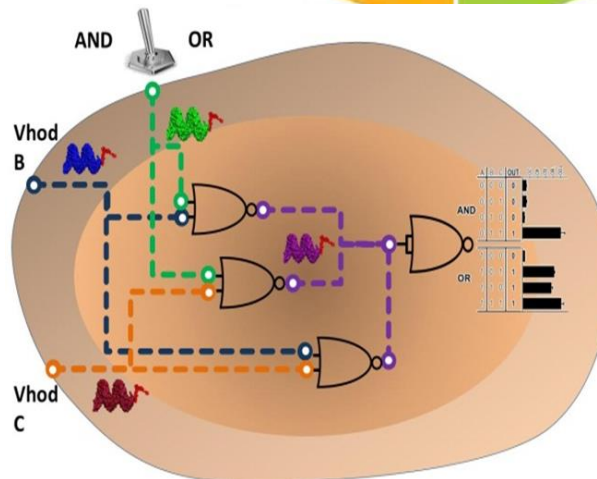
advanced materials in circular economy



Podobnik M et al. (2016)
Nature Comm. 7:11598.



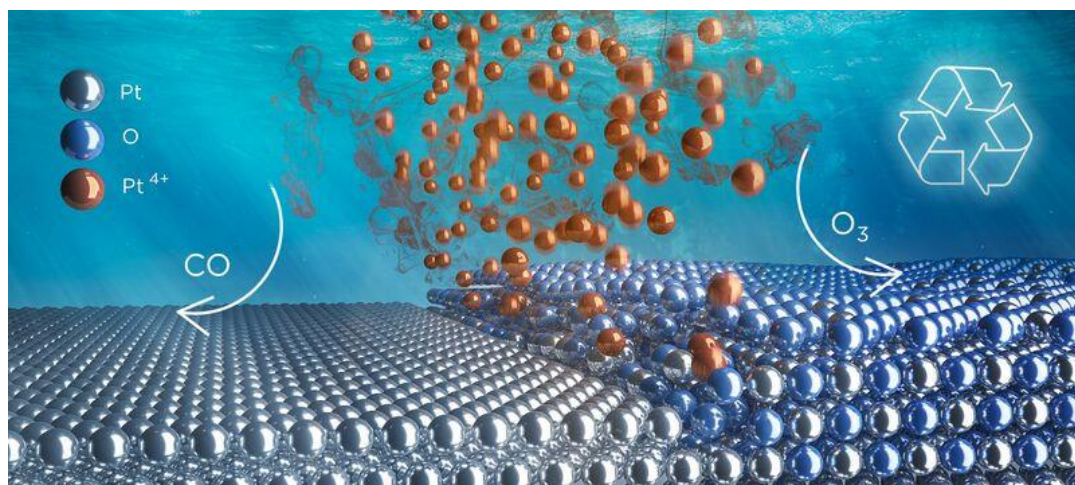
Gradišar H et al. (2013)
Nature Chem. Biol. 9: 362-366.



Gaber R et al. (2014)
Nature Chem. Biol. 10: 203-208.



advanced materials in circular economy



Hodnik N et al. (2016) Nature Commun. 7:13164.

The climate challenge

- Urgent need for both mitigation & adaptation
- Combined action of business, academia, citizens & government
- Huge global risk, but great opportunity for creation of a green economy
- Climate-KIC in key position



Impact for:

CLIMATE

ECONOMY

SOCIETY



Climate-KIC

..which Climate-KIC addresses...



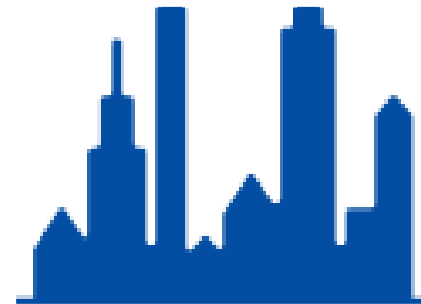
Smart land use



Decision metrics and finance



Sustainable production systems



Urban transitions

National Institute of Chemistry

Hajdrihova 19
1001 Ljubljana

Webpage: www.ki.si
e-mail: project.office@ki.si
Phone: 00386 (1) 476 0498
Fax: 00386 (1) 476 03 00

