



INDTECH2018

Innovative industries for smart growth

29-31 October, 2018
Vienna, Austria

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PILLAR 3

Session 3.5

**Some insights on Nano-materials industrial application
(Ukraine-EU cooperation)**

Andrey V. Ragulya

National Academy of Sciences of Ukraine

31 October 2018

Activity of Ukrainian organizations in H2020 since 2015

Totally: **91** project (with partners from all the EU MS and AS)!

R&I in Materials & Nanotechnologies: **22 (24%)**

RISE: **15** [3- NANOTECHCENTER LLC, 2- MRC LLC, CARAT LLC, I.F. Lab LLC., UkrOrgSynthesis Ltd, Technologica LLC, Institute of Magnetism NAS&MES, 2-Galkin Phys-Tech Institute NAS, Institute of Physics NAS, Organic Chemistry Institute NAS, Zhukovsky Aviation University, Shevchenko State University, Sumy State University, Lviv Medical University, Lviv Polytechnica]

RIA: **3** [DB Yuzhnoye, Bakul Institute of Superhard Materials NAS, VNIPI TRANSGAZ]

CSA: **3** [2- NTC BIOMASA LLC, DB Ivchenko Progress + National Aviation University]

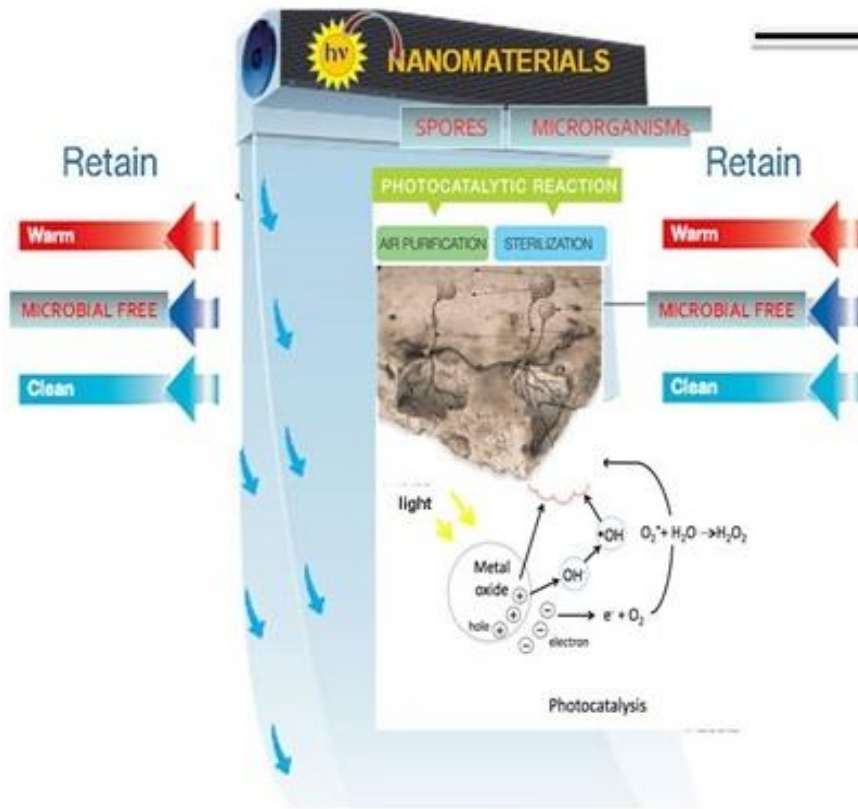
IA: **1** [DB Yuzhnoye]

SMEs: **11** Projects (9 RISE, 2 CSA)

NAS+MES: **6 + 6** (9 RISE, 1 RIA, 1 CSA)

Industry: 4 (2 RIA, 1 IA)

NANO GUARD 2 AR NANOMATERIALS-BASED INNOVATIVE ENGINEERING SOLUTION TO ENSURE SUSTAINABLE SAFEGUARD TO INDOOR AIR



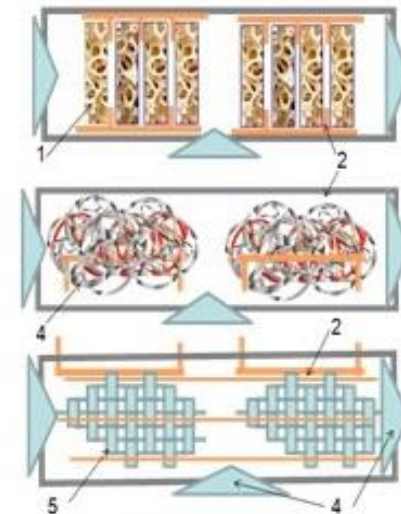
2b. Photosensitisation NMs unit

Advanced NMs-driven Photosensitizers will be fitted into the air-curtain installation designed in adjustable modular modes to provide sustainable "microbial-free" solution for indoor buildings environment.

The proposed advanced NM-driven photocatalytic unit will provide both effective indoor air disinfection and high efficient sterilization of all types of the microorganisms (fungus, fungal propagules, bacteria, their spores and germination).

Being penetrable, purifying/fumigating and transparent, the disinfection air-barrier will protect the premises from microorganisms, both of environmental and of accidental human origin.

The NM-enhanced air curtain solution will additionally help to promote the ambient air improvement (microbial-free and less-humid), thus creating a comfortable climate for the people and protection them from microbial exposure.



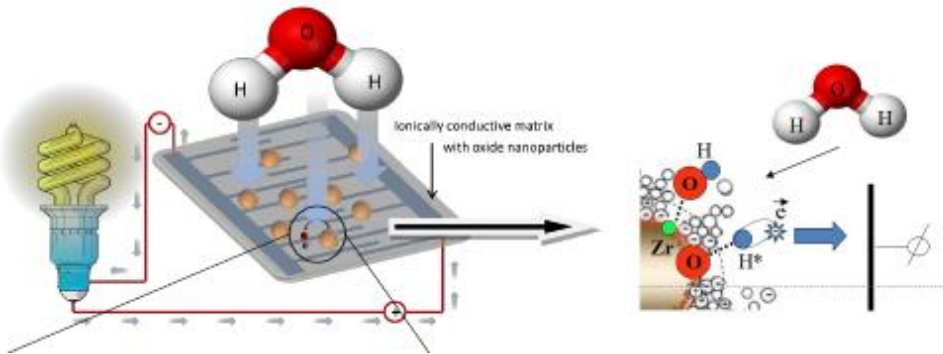
- 1 – Nanoceramics Porous Blocks
- 2 – Light rods
- 3 – Air flows
- 4 – Nanoceramics Fibers
- 5 – Nanoceramics Corrugated Plates

Overall integrated at NANO-MACRO scales System Presentation

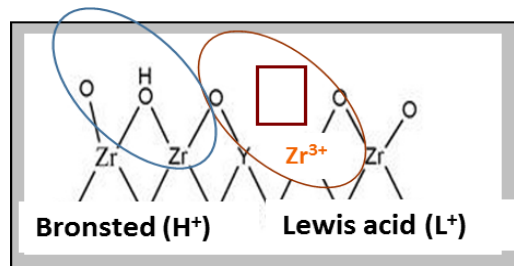
Advanced Humidity to Electricity Converter – “HUNTER” N 691010



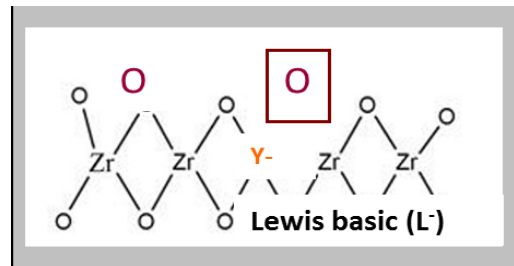
Energy from the interaction of the water molecule with the NP surface



Surface structure based on DSC, ESR, FTIR, UV-vis
400°C

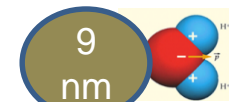


700°C

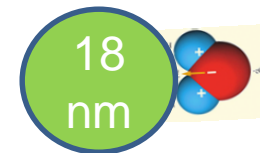


Mechanism water adsorption on NPs surface

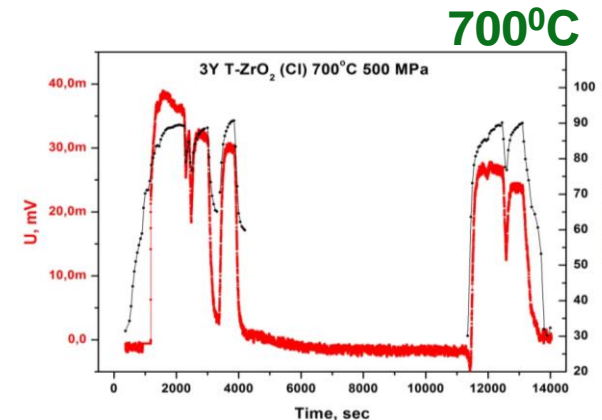
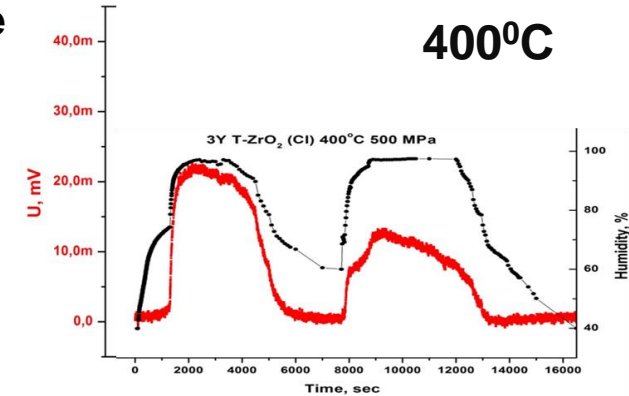
Water orientation by Oxygen



Water orientation by Hydrogen



Generation of electric potential

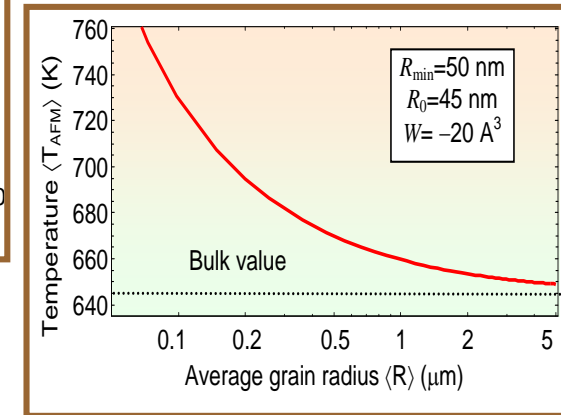
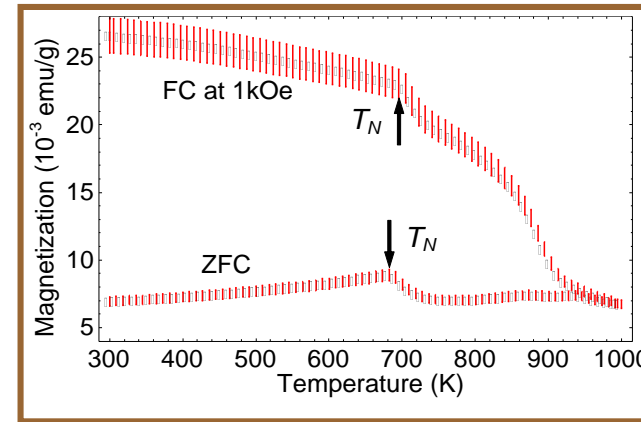
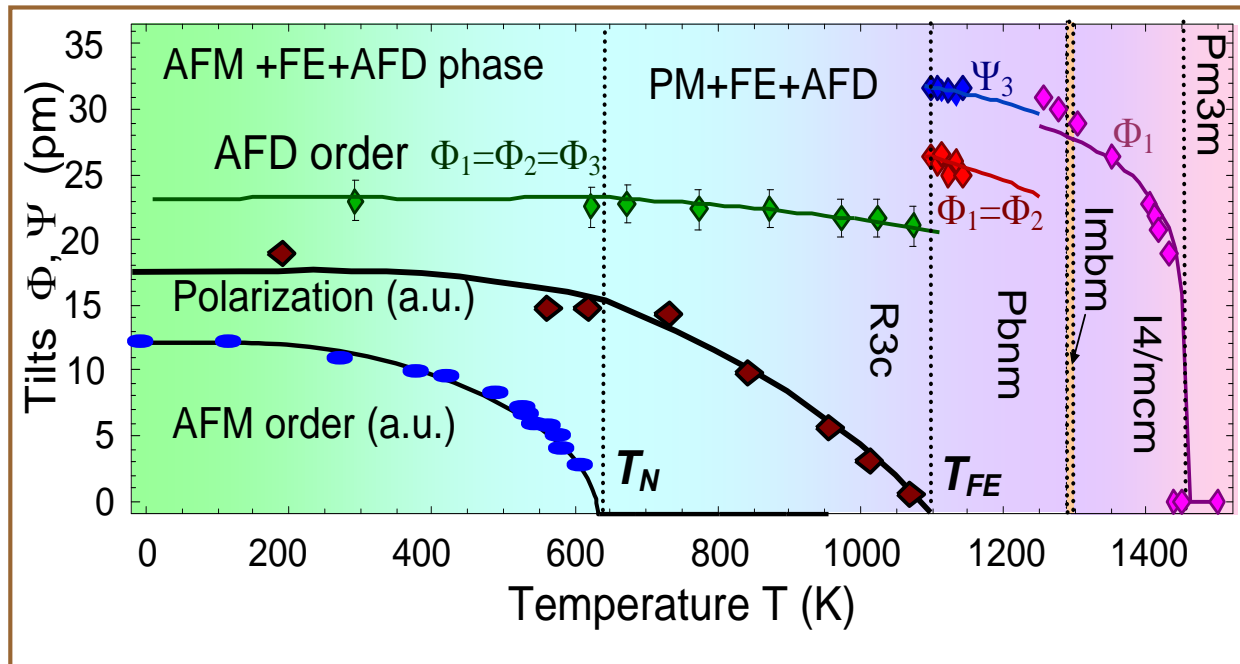


778070 – TransFerr – H2020-MSCA-RISE-2017

Transition metal oxides with metastable phases: a way towards SUPERIOR ferroic properties

Complete description of multiferroic bismuth ferrite BiFeO_3 phase diagram

Rotomagnetic coupling in fine-grained multiferroic BiFeO_3



to control antiferromagnetic state of multiferroic BiFeO_3 via biquadratic antiferrodistortive rotomagnetic, rotoelectric, magnetoelectric, and magnetostrictive couplings.

Project #690945 “Carbon-based nano-materials for theranostic application” (CARTHER), 2016-2019

1. INSTITUT NATIONAL DES SCIENCES APPLIQUEES DE LYON, France 2. CORPORATION SCIENCE PARK TARAS SHEVCHENKO UNIVERSITY OF KYIV, Ukraine
3. RAY TECHNIQUES LTD , JERUSALEM, Israel, 4. ASTON UNIVERSITY, BIRMINGHAM, United Kingdom, 5. CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS), France, 6. UNIVERSITE LYON 1 CLAUDE BERNARD (UCBL), VILLEURBANNE, France

Research strategy to study the impact of nanoparticles on biological cells

Photoelectric, Photothermal and Photoacoustic techniques

