Substitution of Critical Raw Materials: Synthesis, Characterization and Processing of New Advanced Materials in optoelectronic and magnetic devices.

i) Introduction

The Symposium aims to attract at the EMRS meeting experienced researcher as well as industries in the field of the substitution of critical raw materials in electronic and magnetic devices to increase the synergies in this community and help in the development of new efficient devices free from CRMs

ii) Scope

Raw materials are fundamental in most technological applications, however some of them are being recently defined by the EU commission as "critical" due to the high risk of supply shortage expected in the next 10 years and for their importance in the European Industry.

The theme of Critical Raw Materials is fundamental to Europe's economy, and their substitution or reduction is essential for maintaining and improving the quality of life and technologies.

Different devices utilize nowadays compounds with CRMs as key elements, from **lighting devices**, (**LED, OLED, CFL:** Rare earths, like Ce, Y, Eu and Tb, In as CRMs), to optoelectronics, such as **transparent conductive layers** (In as CRM), **permanent magnetic materials** (in SmCo, NdFeB), **catalytic converters**, **electrode catalysts in fuel cells** (Pt group metals (PGM) and Rh-based catalysts) and **rechargeable batteries** (rare earths, graphite, Co, Li and Ni as CRMs). Research is needed to improve the fundamental understanding of the development of new material solutions with a reduced or completely eliminated critical content, while maintaining or enhancing the performance of the materials, components and products.

The design of the alternatives compounds, the control of growth process coupled with accurate characterization are mandatory for further development of new CRM free devices.

The symposium, organized by members of RESET commitment, will provide an interdisciplinary platform to discuss about the alternatives to these materials from modelling, to the synthesis and processing up to their integration in the actual optoelectronic devices and hard magnets.

Bringing together researchers from academia and industry we would increase the interactions among scientists, engineers, students working on different aspects in this field that too often are treated separately. Experimental research and computational modelling will provide complementary views and a unique opportunity in this challenge for a sustainable technological growth.

The theme of the Critical raw material is fundamental to Europe's economy, and their substitution or reduction is essential for maintaining and improving the quality of life and technologies. In this context the EU Commission and the European Innovation Partnership (EIP) are giving much effort to push the alternatives to these elements: specific calls in H2020, the creation of the EIP on raw materials, and the

creation of recognized commitments. **Among them the RESET commitment is strongly focalized on the substitution of CRMs in electronic and optoelectronic devices**. This symposium can be inserted in the actions of the commitment and will be promoted by using all the channels inside the EIP.

Hot topics to be covered by the symposium

Materials Science, Design, Synthesis, Growth, Characterization of **Advanced Materials with reduced or free from CRMs for :**

- Transparent conductive layers
- Rechargeable batteries,
- Phosphors for LED applications, Scintillators, Displays
- OLEDs
- Catalysis
- Photovoltaics
- Smart windows,
- Exchange-coupled nanocomposite magnets with less or no REEs
- New RE-free highly anisotropic magnetic materials
- New and energy efficient motors and generator technologies which do not depend on permanent magnets

3. Symposium organizers

i) Principal organiser:

Dr. Pier Carlo Ricci
Dipartimento di Fisica, Università di Cagliari
Complesso Universitario di Monserrato
S.P. Monserrato-Sestu Km 0,700
I-09042 Monserrato (CA)
ITALY
Phone number: **+39 0706754821**
E-mail address: carlo.ricci@dsf.unica.it

ii) Co-organizers : (maximum 3)

A	B
Dr. Valentina Ivanova Affiliation **CEA Tech** **Scientific Direction** Address **CEA Saclay - Nano-INNOV** **Bât. 861 – PC 1043** **91191 Gif-sur-Yvette Cedex, France** Phone number: **+33169082349** E-mail address: valentina.ivanova@cea.fr	**Dr. Maria Luisa Grilli** Affiliation: **ENEA, Casaccia, Unit of Materials Technology,** **Optical Coatings Laboratory** Address: **Via Anguillarese 301, 00123 Rome, Italy** Phone number: **+390630486234** E-mail address: **marialuisa.grilli@enea.it**

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José A. De Toro
Affiliation
Departamento de Física Aplicada & IRICA,
Universidad de Castilla-La Mancha (UCLM)
Address
EIA, Ronda de Calatrava 7
13071 Ciudad Real, Spain
Phone number: **+ 34 926 295300, ext. 6643**
E-mail address**:** joseangel.toro@uclm.es

7. Tentative list of invited speakers and, if possible, the title of the presentation

Josep Nogués, ICN2 and Universitat Autònoma de Barcelona, Spain
João Rocha, University Aveiro, Portugal
Jolien Dendooven, University of Ghent, Belgium
Esko I. Kauppinen, Aalto University School of Science, Finland
Dominique Givord, Institut Néel, CNRS/UJF, Grenoble, France
Anna Vedda, Università degli Studi di Milano BICOCCA, Italy
Ion Tiginyainu Academy of Sciences of Moldova , Moldova

The list will be further adjusted and integrated by invited talks selected from outstanding submitted oral contributions, preferentially chosen among younger Researchers.

8. Tentative list of scientific committee members

E. Bouyer (France)
C. M. Carbonaro (Italy)
D. Chiriu (Italy)
J. M. Colino (Spain)
S. Cuesta (Spain)
M. Hillenkamp (France)
Y. Huttel (Spain)
N. Laidani (Italy)
R. Matthieu (Sweden)
P. Nordblad (Sweden)
P. Normile (Spain)
D. Peddis (Italy)
A. Rizzi (Germany)
M.L. Ruello (Italy)
G. Singh (Norway)
A. Tchelnokov (France)
J. Van Duijn (Spain)