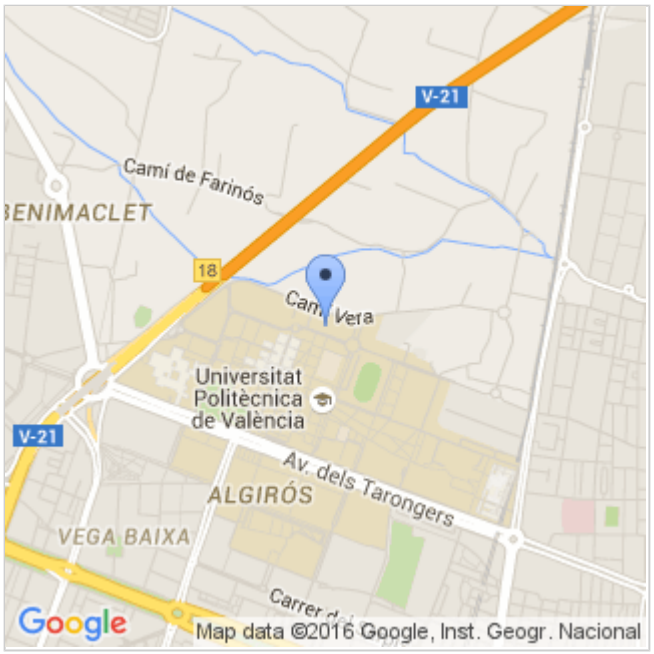
Expression of Interest



Contact Person/Scientist in Charge

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Universitat Politècnica de València (UPV)

Department / Institute / Centre

- **Name:** Institute of Design and Fabrication (IDF) - Universitat Politècnica de València
- **Address:** Campus de Vera; Camino de Vera, s/n; Valencia (46022)
- **Province:** Valencia

Research Area

- Chemistry (CHE)
- Physics (PHY)

Brief description of the institution:

Universitat Politècnica de València (UPV) is the single Spanish Technical University that features in the main University world rankings. It is within the top 5 Spanish Universities with the highest revenue from both public research and knowledge transfer activities, and a national leader in patent license income and start up creation. Constituted in 1971, it comprises nearly 30.000 students, over 2500 academics, and 17 university research centres of excellence.

UPV has a relevant experience in the participation in international research programmes, with over 100 FP7 projects and 40 H2020 projects in the period 2014-2015. UPV researchers are also actively involved all H2020 life program stages, from workprogramme drafting discussions, to project coordination. It is also taking part in several major partnering initiatives (JTIs, PPPs, KICs…).

Brief description of the Centre/Research Group (including URL if applicable):

The research group of Materials at Extreme Conditions of Pressure and Temperature (EXTREMAT) is a very active and young group, whose main objective is the synthesis and characterization of properties of materials and nanomaterials, with interest either in Electronics, Photonics, Optoelectronics and Spintronics, or in minerals with interest in Geophysics and Astrophysics. Our group has experience in the experimental characterization of structural, vibrational, optical and electrical properties of materials at extreme conditions of pressure and temperature. Our strongest point is the analysis of materials properties from both experimental and theoretical points of view, thanks to our collaborations with many theoretical groups, which allow us to get a better understanding of the physical-chemical properties of materials in order to design new materials with improved properties. The group is leaded by Dr. Francisco Javier Manjón, a former Marie Curie Fellow at the Max Planck Institute for Solid State Research. In the last years our group has received three postdoctoral fellows (Drs. S.Ray, A.L.J. Pereira, and J.A. Sans), who are still engaged with us in our current research, and two of them have now permanent positions in their respective countries. In summary, we are a very attractive group for young people, either experimentalists or theoreticians, with a background in Physics, Chemistry or Engineering, and looking for a dynamic group committed with excellence in research at the frontier of Materials Science.

http://www.institutoidf.com/index.php/es/presentacion-extremat

Project description:

ABO3 and A2X3 compounds at extreme conditions of pressure and temperature

Metal oxides of the ABO3 family (including sesquioxides A2O3) are materials used in a number of applications due to their exceptional properties, including high chemical, mechanical and thermal stability. They are interesting from a fundamental point of view for Condensed Matter, Solid State or Earth Sciences, and also have a marked interest for applications in Optoelectronics and Photonics. Thus, research in these compounds and related compounds, such as sesquichalcogenides A2X3 (X=S,Se,Te), is fundamental for the understanding of the properties-structure-composition relationship in these compounds in order to optimize their exceptional properties and go ahead towards the Circular Economy that European Union is committed to undertake in the next decades.

Pressure is a thermodynamic variable whose change is very important for material characterization because it allows a precise control over the interatomic distances and consequently of interatomic interactions, which are crucial to understand material properties. Moreover, the application of pressure, many times in combination with low or high temperatures, allows synthesizing new phases of materials with completely different properties to those from stable materials at ambient pressure, and which can be metastable at ambient pressure and lead to new technological advances.

The main objective is the characterization of the structural, vibrational, mechanical, optical and electrical properties of metal oxides of the ABO3 family (both in bulk and in nanoparticles) at extreme conditions of pressure and temperature with the aim to understand and optimize their properties for their application in optoelectronic and photonic devices.

Applications

Interested researchers can submit a CV, a letter of motivation, and at least one letter of support. There is no deadline for the sending so far.