

## PRESENTER INFORMATION



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### **BIOGRAPHICAL SKETCH**

Francisco Javier Fernández Alonso holds a degree in Physics from the Autonomous University of Madrid and a Master's degree in Advanced Materials, Nanotechnology, and Photonics. He is currently beneficiary of a competitive national predoctoral contract for university professor training, where he is developing his doctoral thesis on the study of nanostructured oxides for functional applications.

**TITLE** Nanostructured metal oxides for environmental applications

### **ABSTRACT**

In this talk, various techniques developed to improve the efficiency of commonly used metal oxides such as  $\text{TiO}_2$  and hematite will be discussed.

In the case of  $\text{TiO}_2$ , we will discuss how the photocatalytic efficiency of  $\text{TiO}_2$  nanotubes in drug degradation can be significantly improved through a reduction process using a MW-induced plasma. This method has the main advantage of being much cheaper and faster than other more commonly used methods. Furthermore, it will show how photocatalytic efficiency can also be significantly improved through gold loading.

In the case of hematite, it will be shown how co-doping with Ti and Sn can improve the photocurrent of PEC cells based on hematite nanowires from  $0.03 \text{ mW cm}^{-2}$  to  $1.27 \text{ mW cm}^{-2}$ . On the other hand, it will be shown how hematite nanoparticles can be easily reduced by a MW plasma, obtaining saturation magnetizations greater than  $40 \text{ emu/g}$ . These nanoparticles can have functionality in both environmental and medical applications.