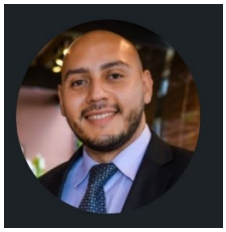
JECS TRUST PROJECT: Contract 2019204

"Fabrication and characterization of LSM (La0.8Sr0.2MnO3) powders with enhanced microstructure and performance through coating particles"	
Applicant:	Ing. René Miguel Guillén Pineda
From (laboratory):	Materials Technological Institute (ITM-UPV). Valencia, Spain
Host (laboratory):	Central European Institute of technology -CEITEC BUT. Brno, Czech Republic
Date(s) of the stay:	(February—June) 2020



My personal and professional experience has been enriched by the JECS Trust mobility project, which allowed me to seek and create opportunities in different research institutions, generating synergy in the field of study across Europe. The main driver for me to select the CEITEC was their renamed experience and professionals on the area of research I was pursuing. Once defined that, I established a research program with clear objectives and metrics of what I wanted to achieve.

CEITEC not only opened its doors to carry out this project, but it also allowed me to create a new network of colleagues and friends with whom we are preparing new collaboration initiatives for future research projects.

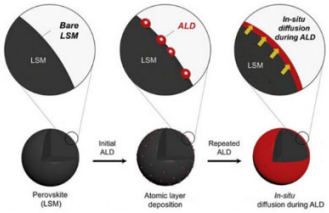
Project objectives:

The aim of the research was to study new ways of synthesis and sintering for the manufacture of components with improved properties that change the surface energy of the perovskite structure materials LSM ($La_{0.8}Sr_{0.2}MnO_3$) and LSM ($La_{0.8}Sr_{0.2}MnO_3$) + Zirconia (8Y-TZP). Strontium doped lanthanum manganite (LSM) are used for the manufacture of magnetic devices and widely as a cathode material in solid oxide fuel cells (SOFC). The host institution provides two technologies that were used in this project:

- Atomic layer deposition (ADL)
- Preparation of plasma activated powders (DBD)

It is possible to obtain the activation energy of each material making use of the heating speeds: 20 ˚C / min, 10 ˚C / min, 5 ˚C / and 2 ˚C / min at 1400 ˚C / 15 min using a dilatometry equipment. At the same time, using SPS, the sintering process of each material was carried out at different heating speeds: 50 ˚C / min, 100 ˚C / min and 200 ˚C / min at 1200 ˚C / 2 min. The data obtained are used to calculate the activation energy of conventional and unconventional sintering for all the powders used for the generation of master curves for the prediction of material properties based on residence times and working temperatures.

Plasma activated powders.



Atomic layer deposition (ADL)