



## POSTDOCTORAL RESEARCH ASSOCIATE October 2019

### SUBJECT TITLE

Nanostructured negative electrodes for magnesium-ion batteries

### SUMMARY

The subject is part of an ANR project on the development of negative electrodes for magnesium (Mg)-ion batteries. Magnesium is an excellent alternative to lithium due to its high specific capacity, low cost, abundance on Earth and low reactivity. However, conventional electrolytes interact strongly with metallic magnesium to form a blocking layer on the surface of metallic Mg, inhibiting reversible electrochemical reactions. An interesting solution to overcome this problem is to replace the Mg metal electrode with a material compatible with electrolyte solutions having a large electrochemical stability window. Interestingly, Mg alloy compounds have adequate stability in conventional electrolytes, slightly higher potentials than pure metallic Mg with however lower specific capacities than Mg. As part of an ANR project, the LEEL laboratory develops new alloy compounds for Mg batteries in the form of nanostructured electrodes to overcome volume expansion and slow diffusion of ions during the alloying with Mg.

In this project, the postdoctoral associate will first be in charge of the fundamental understanding of the reactivity towards the electrolyte of the alloys developed in the laboratory, notably through impedance spectroscopy and XPS. Secondly, the postdoctoral associate will deal with the electrode and electrolyte formulation's optimization with a systematic comparison of electrochemical performances in half-cell. Finally, full Mg-ion cells will be made with the better electrode/electrolyte combination.

### PROFILE

PhD in materials science or chemistry with experience in electrochemistry. A previous experience in the field of batteries will be highly appreciated.

### CONTRACT DURATION

1 year starting from October, 2019

### CONTACT

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### HOSTING TEAM

UMR CEA/CNRS NIMBE (NIMBE (Nanosciences et Innovation pour les Matériaux, la Biomédecine et l'Énergie). Equipe LEEL  
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Send your CV and motivation letter to [magali.gauthier@cea.fr](mailto:magali.gauthier@cea.fr).

<http://iramis.cea.fr/Pisp/magali.gauthier/>

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