

# Sodium-ion battery modeling for BMS implementation

## Activity:

Two years after the first battery prototype using sodium-ion in a standard industrial format was designed, the start-up Tiamat has been created (2017) to design, develop and produce this promising technology (<http://www.tiamat-energy.com>). Sodium-ion batteries are expected to counter some of the limits of the lithium-ion batteries that dominate the market today, such as recharge rate, lifetime and production cost. Specifically, sodium-ion batteries may allow mass storage of intermittent renewable energies (wind or solar) or may equip electric vehicles. Located in Amiens, this company came out of the French network for electrochemical energy storage (RS2E) supported by CNRS. Today it has several tens of functional prototypes, and plans to launch larger scale production by 2020.

Accurate prediction of range of an energy storage system (ESS) is a significant issue and a key market qualifier. ESS range forecasting can be achieved through the application of advanced modelling. Battery modelling plays a vital role in this area. In addition, battery modelling is essential for safe charging/discharging and optimal usage of batteries. Much existing work has been carried out on incumbent Lithium-ion (Li-ion) technologies, but these are reaching their theoretical limits and modern research is also exploring promising next-generation technologies. For that reason, Tiamat and UTC (Université de Technologie de Compiègne) collaborate to develop an electric model for the sodium-ion batteries of Tiamat.

UTC has been working on battery modelling for more than 20 years. Studies have been carried out on several technologies like Ni-MH and Li-ion (LFP, LMO, NMC, LTO...) to characterize and predict their electrical and thermal behaviors during their whole lifespan. Today, UTC is happy to join Tiamat and to provide its experience and testing facilities for the study of the new and promising sodium-ion batteries.

## Responsibilities:

We are looking for a researcher to develop the electric model of sodium-ion batteries for BMS implementation. The responsibilities of the researcher will be:

- Benchmark the existing model for the lithium-ion batteries
- Develop an electrical model for the sodium-ion batteries
- Design of experiments to determine the electrical model parameters
- Publish research outcomes in top academic journals and conferences

## Profile:

- You have a PhD degree in electrical engineering, with a solid background in batteries
- You have experience in modeling power systems
- Starting period by January 2019
- You should have obtained clear scientific contributions during your PhD, e.g. shown through publications in relevant academic journals
- Interested to work in a team with experts studying different aspects of sodium-ion batteries

## Offer:

- A well-funded post-doc position (annually salary of 35 to 38 k€ depending on experience)
- Location of the job will be mostly at UTC (Compiègne)
- Exciting work environment in a team in public R&D project with industry involvement
- The opportunity to be active in an international research environment
- Engage in research collaborations and participate at international conferences

## Interested?

You can apply for this job as soon as possible, by sending your CV, cover letter and publications to:

- Dr. Asmae El Mejdoubi, mail : [asmae.elmejdoubi@tiamat-energy.com](mailto:asmae.elmejdoubi@tiamat-energy.com)
- Dr. Nicolas Damay, mail: [nicolas.damay@utc.fr](mailto:nicolas.damay@utc.fr)