Postdoc proposal

Subject:
Development and Implementation of Online Diagnostic and Control Tools for PEM Electrolyzers

Description of the Postdoc Project:
The Polymer Electrolyte Membrane Water Electrolyzer (PEMWE) is regarded as one of the most promising technologies for hydrogen generation from renewable sources. Online monitoring of internal thermodynamics, electrochemical states, and key component degradation levels is essential for optimizing PEMWE stack/system design and operation. Efforts are being undertaken to enhance PEMWE characterization, modeling, diagnosis, and control methodology development.

In line with this, the postdoc work will encompass four main areas:

1. Establishing and configuring a 2-kW PEMWE test bench using carefully selected materials and integrating various in-situ and in-operando characterization tools.
2. Designing online implementable, control oriented, multiscale PEMWE models capable of deducing internal operational and degradation states.
3. Creating hardware/software online diagnostic methods utilizing available characterization tools, data, and/or the developed models.
4. Developing control strategies for auxiliary actuators (e.g., water pumps, valves, power converters) to enhance PEMWE efficiency and performance.

Working Conditions:
The postdoc position is funded by the ANR "Junior Professor Chair" grant, supervised by Dr. Zhongliang LI. Experimental work will utilize facilities supported by the ANR PEPR project "Equipex+ DurabilitHy" (Project Link). The postdoc's tasks will complement ongoing PhD projects within the team.

Applicants' Profile:
Candidates should possess expertise in the characterization, modeling, and analysis of electrochemical devices (such as fuel cells, batteries, and electrolyzers). Experience in hydrogen fuel cell or electrolyzer system design, automation, and testing will be a significant advantage. An ability to work collaboratively in a team setting is essential.

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Period: The position is for one year, with a possibility for renewal upon completion of the initial contract. The start date is flexible, between October 2023 and May 2024.