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Experimental analysis to evaluate performance influence of carbon felt compression for an AQDS-Br flow battery

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Nowadays, the necessity to reduce the human footprint on the ecosystems is clear and accepted as priority for most part of the governments worldwide. The industrial renewable energy sector has therefore received in the last few years an impressive push with bigger acceleration in Europe, due to the public opinion receptivity and efficient policies, which help to merge the new green solutions within the traditional electric grid. Due to these aspects, over the past 30 years the electric industry has been characterized by a transition from a centralized production structure towards a horizontal one, based on the deployment of intermittent renewable resources. In this contest, it is clear that how the development of highly efficient and reliable energy storages is becoming the new challenge for researchers and development engineers. Among all the solutions proposed and still under development, redox flow batteries are lately receiving a lot of interest worldwide for their clear advantages over traditional systems. Despite this, many issues are still open regarding these systems. Bipolar plates together with electrolytes and membranes accounts for almost 50% of the overall cost of a typical flow battery. In particular, the flow field of bipolar plates and the choice of the electrolytes can directly affect cost and efficiency. In particular, this paper focuses on the analysis of the carbon felts used for an innovative AQDS-Br battery. The research pursues an extensive experimental analysis with the target of quantifying the influence on battery performances of the carbon-felt compression between two single plates. The work focuses on the description of the experimental setup, the description of the experimental test campaign and the results discussion. Final aim of the study is to link carbon felt compression and battery performances.

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