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Abstract submission

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Prospects for industrial scale vanadium redox flow batteries

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Energy storage is a key technology for the transition to decarbonized energy in smart grids, being able to provide different services, classified into energy management, with long discharges, and power quality, with fast responses. Recently, the interest for long storage is also emerging, e.g. in seasonal storage. Different technologies are available to store energy, among which closed batteries (lithium, sodium, ...) are strong enablers, thanks to features such as low environmental impact, flexible location, scalability, stillness, high efficiency. However, closed batteries present issues e.g. life duration, safety and self-discharge. In this framework, redox flow batteries (RFB) are emerging as a competitive option for several services. Storing energy in liquid electrolytes kept in tanks outside the reactor, they provide independent sizing of energy and power, thus allowing for long discharge times at full power which are inaccessible for closed batteries. Their most developed version, the vanadium RFB, exhibits very long life, virtually no self-discharge, operation at room temperature and pressure and absence of hazard risks such as fires and explosions. While these VRFBs are in an early market phase, more research is needed to improve their performance and competitiveness.