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18. abstract <p>To meet the challenges of the energy transition and the electrification of the transport sector, the development of alternative, emission-free drive solutions is essential. A central problem for hydrogen mobility so far has been the lack of infrastructure, especially for small and lightweight vehicles such as e-bikes, light vehicles, or drones. The technologies that have dominated until now—batteries and compressed hydrogen—are reaching their limits in terms of energy density, charging times, safety, and economic efficiency.</p> <p>As part of the BMW-funded joint project PowerPaste, an innovative, compact, and modular energy supply for electric drives based on fuel cells was developed. At the core of this innovation is the PowerPaste technology, which allows hydrogen to be stored and released safely, without pressure, and as needed. This enables a flexible, safe, and easy-to-use energy supply for mobile applications, without relying on a traditional hydrogen infrastructure.</p> <p>The subproject of Vitesco Technologies GmbH focused on the development and production of a water-cooled PEM fuel cell with approximately 1 kW of electrical output, which was specifically optimized for operation with PowerPaste. The main focus was on the design and coordination of the cell and stack, the development of metallic bipolar plates, and the integration of the system into a demonstrator vehicle. The collaboration with partners such as Fraunhofer IFAM, ZBT, and EMEC enabled successful implementation.</p>		
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