Development of Robust Metal-Supported SOFCs and Stack Components in EU METSAPP Consortium - DTU Orbit (12/12/2018)

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The potential of MS-SOFCs was demonstrated through the previous EU METSOFC project, which concluded that the development of oxidation resistant novel metal-supported solid oxide fuel cell (MS-SOFC) design and stack is the requirement to advance this technology to the next level. The following EU METSAPP project has been executed with an overall aim of developing advanced metal-supported cells and stacks based on a robust, reliable and up-scalable technology. During the project, oxidation resistant nanostructured anodes based on modified SrTiO₃ were developed and integrated into MS-SOFCs to enhance their robustness. In addition, the manufacturing of metal-supported cells with different geometries, scalability of the manufacturing process was demonstrated and more than 200 cells with an area of ~150 cm² were produced. The electrochemical performance of different cell generations was evaluated and best performance and stability combination was observed with doped SrTiO₃ based anode designs. Furthermore, numerical models to understand the corrosion behavior of the MS-SOFCs were developed and validated. Finally, the cost effective concept of coated metal interconnects was developed, which resulted in 90% reduction in Cr evaporation, three times lower Cr₂O₃ scale thickness and increased lifetime. The possibility of assembling these cells into two radically different stack designs was demonstrated.

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