Tomographic Screening of Flow Field Current Collectors for Water Electrolysis

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For the production of pure hydrogen, PEM electrolysis is suited.[1] Water splitting at room temperature demands at least 1.48 V of thermoneutral voltage.[2] In our system this is facilitated by a combination of a light focusing Fresnel lens and a III-V tandem solar cell, providing the electrolyser with voltages of >2V. A key component in our system is the porous titanium mesh, which functions both as a current collector and a flow field (FF/CC).[3] In order to maximize the performance of the system and simultaneously minimize the costs, a suited candidate must be found. In this study we present simple yet important transport parameters of multiple candidates and show correlations between these transport parameters. The hydraulic resistance, calculated in our 3D X-ray reconstruction, will also be validated by a simple flow experiment.

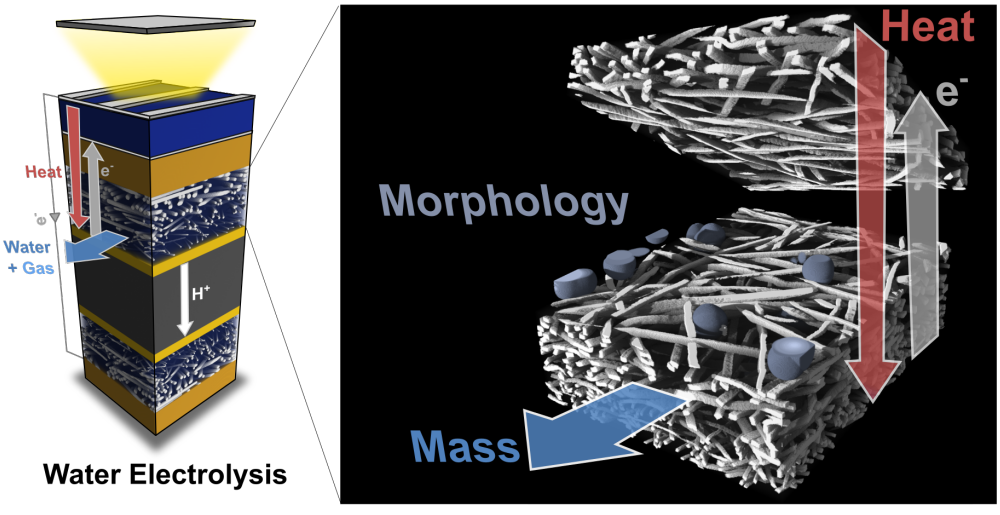

Figure 1 *Left: The HyCon system: A direct combination of a solar cell (tandem cell) and an electrolyser. Right: A key component, the flow field current collector.*[3]

Keywords: PEM water electrolysis, X-ray tomography, transport

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