

Poster-Session

Reactive sputtering of ceramic hydrogen barrier coatings

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Hydrogen as an energy carrier plays a major role both as a fuel in direct combustion and in energy conversion in fuel cells and electrolyzers. Due to their susceptibility to hydrogen embrittlement, metallic components of some steels and titanium have to be protected by thin hydrogen barrier layers. As promising candidates, which can be deposited via reactive magnetron sputtering, in batch as well as in inline processes, tungsten carbide, zirconium nitride and DLC were identified. An electrochemical and a gas-driven permeation measurement method was used to evaluate the barrier effect. With a permeation reduction factor (PRF) of up to 550 and a long-term stability of the barrier property, very good hydrogen permeation barrier layers could be confirmed.