

Sputter-etching treatment of proton-exchange membranes: Completely dry thin-film approach to low-loading catalyst-coated membranes for water electrolysis

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Currently growing popularity of solar and wind power plants lead to high demands on reliable and scalable systems, which would be capable of storing the energy during the overproduction periods and releasing it while it is deficient. The interesting alternative is a hydrogen economy concept. The concept is based on the storing of produced electrical energy in the form of chemical energy, specifically in the form of H_2 . Thus, it is possible to create a large amount of H_2 in times of overproduction. The key inseparable technology necessary for the concept of hydrogen economy to function remains the water electrolysis. Proton exchange membrane water electrolyzer seems to be very promising concept of electrolyzer. However, there are still challenges which need to be dealt with. Especially the need of reducing the amount of iridium used as a catalyst on the anode side of the electrolyzer. In this work we present a way how to obtain a better utilization of used iridium, which can effectively lead to the reduction of the amount of used iridium by means of reactive magnetron sputtering and proton exchange membrane plasma etching.

Primary author: HRBEK, Tomáš (MFF UK)

Co-authors: Dr KÚŠ, Peter (MFF UK); Dr YAKOVLEV, Yurii; Dr NOVÁKOVÁ, Jaroslava (Charles University); Dr LOBKO, Yevheniia (Charles University); Dr KHALAKHAN, Ivan (Charles University); Prof. MATOLÍN, Vladimír (Charles University); Prof. MATOLÍNOVÁ, Iva (Charles University)

Presenter: HRBEK, Tomáš (MFF UK)

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