

A manganese oxide-based electrode as an efficient water-oxidizing anodeS. Heidari¹, G. R. Patzke^{1*}¹Department of Chemistry, University of Zurich, Winterthurerstrasse 190, 8057 Zurich, Switzerland

Water splitting into O₂ and H₂ is a promising way to prepare eco-friendly fuels in the future. However, the anodic half-reaction in this process is a pivotal point, causing the vast majority of kinetic losses. Compared to the present-day price of the artificial photosynthetic systems, fossil fuels are still the utmost available and inexpensive energy sources [1]. Hence, developing fast and low-cost methods to fabricate efficient water-oxidizing anodes is the bottleneck for the commercialization of hydrogen production from water splitting reaction. In this work, a manganese oxide/FTO electrode was fabricated and used in water oxidation reaction. After optimization steps concerning thickness of the layer and calcination temperature, the electrode was used as an efficient water-oxidizing electrode at pH=7. A stable current density of 1.0 mA.cm⁻² was achieved at an over potential of ~480 mV for more than 100 hours. The fabricated electrodes were characterized with different methods such as FT-IR, Raman, SEM, HRTEM, XRD and XPS before and after long time electrolysis.

[1] James Barber, Phong. D. Tran, *J. R. Soc. Interface.*, **2013**, *10*, 1-16.