O 37 Invited talk Rostrup-Nielsen

Time: Thursday 14:00–14:45 Room: TRE Phys

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Fuel Cells linking Catalysis and Electrochemistry. A challenge to Surface Science — •Jens R. Rostrup-Nielsen and N. Christiansen — Topsoe Fuel Cells A/S, Lyngby, Denmark

Fuel cells represent a challenging overlap of catalysis and electrochemistry. This is illustrated by anode reactions in a solid oxide fuel cell. The fuel (methane, hydrogen..) is activated by chemisorption on the nickel surface of the anode. This is linked to the electrochemical reaction at the interface of the electrolyte and the nickel crystals converting oxygen ions into electrons and water by reaction with adsorbed hydrogen atoms resulting from the activation of the fuel. The sites for these reactions appear not to be the same. This is reflected by different sensitivities of the two steps to poisoning. The role of different sites on the nickel surfrace for the steam reforming reaction is well understood in terms of impact on activity for methane activation, carbon formation and sintering. This knowlegde is applied in an analysis of anodes having been exposed to 13000 hours of operation using an number of characterization methods.