Corrosion characterization of chromium film sputtered on zirconium alloys

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One of the possibilities to improve nuclear fuel cladding is coating of zirconium alloys. Main goals are to achieve a higher life-span of nuclear fuels due to better corrosion resistivity and better safety properties for example in the case of LOCA. Tens of nanometres thick layers of chromium deposited by magnetron sputtering on zirconium were studied by electrochemical impedance spectroscopy and additional surface analysis methods. Corrosion behaviour was studied in the high-temperature high-pressure loop that simulates the primary circuit condition. The results show that the chromium layer formed barrier and slows down the oxidation of zirconium.