Characterization of MIS Photoanode with a Thin SiO_2 Layer for Photoelectrochemical Water Splitting

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Abstract. The results of capacitive and current voltage measurements on metal-insulator-semiconductor (MIS) photoanode structures with n-type silicon substrate are presented in this paper. The best photo-voltage and photo-current results were obtained on MIS structures with SiO_2 grown by Atomic Layer Deposition (ALD). High ideality factor observed in the voltage range 0.1-0.3 V indicates the tunnelling as a dominant transport mechanism through the ALD grown SiO_2 layer. Low Flat band voltages confirmed good passivation properties of the prepared ALD grown SiO_2. High saturation current and low overpotential of MIS photo-electrochemical structure with ALD SiO_2 and RuO_2 catalytic layer predict good applicability of ALD prepared passivation layer for light assisted water splitting.