Impact of UV Aging on Filler Migration Through Cable Insulation Used in Photovoltaic Systems

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Abstract. Photovoltaic systems have become a key element of modern power systems, which increases the demands on the reliability of their components. In addition to the connecting elements, the most critical parts include the cable insulation itself, whose degradation can significantly affect the operability of the entire system. In this paper, an experiment of accelerated aging of cable insulation by exposure to intense UV radiation is presented, and changes in selected electrical properties (insulation resistance, surface resistivity and capacitance) were monitored in different time intervals (0, 250, 500 and 1000 hours). The results show that external UV-B irradiation results in the formation of a surface layer formed by migrating filler, which is mainly manifested by a slight increase in capacitance (≈ 10%) without a significant change in insulation resistance and surface resistivity.