

Bachelor/Master Thesis - Investigation of water exposure effects on the stability and degradation mode of polymeric backsheets and encapsulants of silicon solar modules

Aim: investigation of structural and chemical changes induced by water penetration into polymeric backsheets (BSs) and encapsulants of silicon solar modules resulting in the degradation of the modules and deterioration of their photovoltaic performance.



Project work packages:

(i) Electrical studies of water-exposed solar modules. Characterization of different Si modules in a water tank with voltammetry in the dark and under flash illumination. Photo-/electroluminescence imaging of water-exposed modules to visualize degradation changes in the Si wafers performance.

(ii) Structural changes of BSs and encapsulants induced by water exposure. Mechanical tests of the water-degraded modules coupled to the multi-spectral Raman imaging of the BS cross-sections. Characterization of the surface layers by SEM/EDX.

(iii) Studies of chemical origins of the BS and encapsulant deterioration due to water exposure. Characterization of water-exposed polymers by Raman, fluorescence and NIR absorption spectroscopies. Probing of the surface layers of polymeric layers by surface-sensitive techniques (FTIR and XPS).

Qualifications:

Student of Materials Science, Chemistry or Physics (spectroscopy)

Contact:

Dr. Oleksandr Stroyuk
o.stroyuk@fz-juelich.de

+49 9131 9398 155

Dr.-Ing. Claudia Buerhop
 +49 9131 9398 177

c.buerhop-lutz@fz-juelich.de