

## **Role of Surface and Surface Analysis in Photovoltaics**

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Surface science is intrinsically related to the performance of solar cells. In solar cells the generation and collection of charge carriers determines their efficiency. Effective transport of charge carriers across interfaces and minimization of their recombination at surfaces and interfaces is of utmost importance. Thus, the chemistry at the surfaces and interfaces of these devices must be determined, and related to their performance. In this talk we will discuss the role of two important interfaces, First, the quality of the heterojunction interface in a ZnSe/CdTe solar cell affects the output voltage of this device. X-ray photoelectron spectroscopy gives some insight into the composition of the interface, while ultraviolet photoemission yields the relative energy of the two materials' valence bands at the junction, which controls the open circuit voltage of the solar cell. The relative energies of ZnSe and CdTe at the interface is directly affected by the material quality of the interface through processing. In addition, the role of surface passivation is very important in limiting the rate of carrier of recombination. Here we will combine x-ray photoelectron spectroscopy of the surface of a Si device with electrical measurements to ascertain what factors determine the quality of a solar cell passivation.