

UV photoelectron spectroscopy as a tool for characterizing materials for photovoltaic applications

Francesca MENCHINI - *ENEA Centro Ricerche Casaccia Roma*

Photovoltaic technologies play a fundamental role in the process of accelerating the transition to renewable energy sources for the global needs. A solar cell basically converts an incident photon into two charged carriers which must be collected at the external terminals; efficient charge separation and collection relies on the energy band alignment of the materials constituting the device, so that their knowledge is fundamental to design and characterize heterojunction solar cells.

Ultraviolet photoelectron spectroscopy (UPS) provides a valuable tool to investigate the electronic properties of solids. UV photons excite the valence band electrons and give information on the positions of the valence and conduction band edges and of the Fermi level. We present some results on different materials for photovoltaics, including perovskites absorbers and carrier transport layers, and how they are applied to full devices.

In some cases, however, the UPS technique can bring to experimental errors connected to the geometry of the samples and of the mounting stub and also to ambient contaminations. A brief review of the problems and of possible solutions is also given.