TECHNOLOGY OFFER

WISSENS/ TRANSFER/ OST/

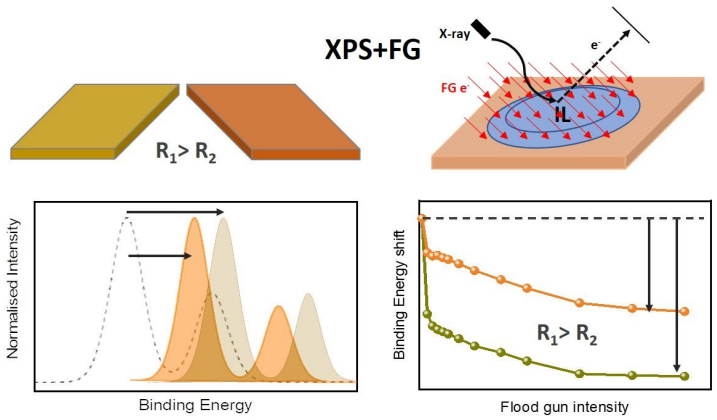
www.wtz-ost.at

NOVEL METHOD TO MEASURE RESISTIVITY OF SEMICONDUCTOR MATERIALS

A new, contactless method for determination of semiconductor conductivity has been discovered. The method is based on electron gun induced changes at buried semiconductor/ionic liquid interfaces leading to changes of the potential drop within the space-charge layer. The resulting potential drop is dependent on the charge carrier concentration of the solid and measured by means of X-ray Photoelectron Spectroscopy (XPS) without the need for contact electrodes.

BACKGROUND

State-of-the-art resistivity measurements of semiconductor type materials commonly rely on electrodes contacting the material to be studied, e.g. van der Pauw method. The novel method allows for measurements without need of contacting electrodes as it is solely based on manipulation of the elctrochemical double layer buried underneath a droplet of ionic liquid on the respective semiconductor type material using low energy electrons from a flood gun (Figure).



From metals over semi-metal towards differently doped semiconductor type materials it was found that recorded shifts of XPS signals of the ionic liquid correlate not only with flood gun intensity, but also with charge carrier concentration of the solid underneath [1, 2]. Thus, this method represents an alternative way if compared to state-of-the-art methods and may be of interest not only for bulk type materials, but also for thin films, multilayer or 2D materials

FURTHER READING

1. A. Foelske and M. Sauer, Electrochimica Acta **319**, 456 (2019) DOI: DOI: 10.1016/j.electacta.2019.06.156
2. A. Foelske-Schmitz and M. Sauer, JESRP, **224**, 51 (2018) DOI: 10.1016/j.elspec.2017.06.007

BENEFITS

- local resistivity measurements
- contacting electrodes not required

APPLICATIONS:
Semiconductor technology
Sensors

DEVELOPMENT STATUS:
Verification required

KEYWORDS:
Dopant concentration
Semiconductor
Conductivity
Thin layers
2D Materials

IPR:
PCT patent application pending

INVENTORS:
Annette Foelske
Markus Sauer

CONTACT:

Tanja Sovic
TU Wien
Research and Transfer Support
Karlsplatz 13/E0154
A-1040 Wien
T: +43.1.5880141537
Tanja.sovic@tuwien.ac.at
www.rt.tuwien.ac.at

TU WIEN TECHNISCHE UNIVERSITÄT WIEN