VSB	TECHNICAL	CENTRE FOR ENERGY	INSTITUTE OF
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	OF OSTRAVA	TECHNOLOGIES	TECHNOLOGY

Pulse photoelectric spectrometer

Description/Parameters:

The photoelectric spectrometer (Instytut Fotonowy, Krakow, Poland) serves as a scientific instrument for characterization of the photoelectric properties (photocurrent, photovoltage) of semiconductors illuminated by radiation of different wavelengths. The wavelengths of the radiation can be freely changed using a monochromator included in the device. The photosensitivity of the semiconductor sample under investigation is obtained by means of an electrochemical cell consisting of three electrodes irradiated by a water-cooled 150 W xenon lamp. The working electrode is an ITO PET foil (mixture of SnO_2 and In_2O_3) with a thin layer of sample with an area of 0.785 cm², the Ag/AgCl reference electrode is in contact with the electrolyte (0.1 M KNO₃) and a Pt wire serves as counter electrode. The advanced software of the spectrometer allows direct recording of photocurrent action spectra and also allows the determination of the ratio of incident photons to converted electrons (IPCE) and, with an integrating sphere, the ratio of absorbed photons to converted electrons (APCE) as a function of wavelength and bias potential.

Possible experiments and their setup:

- Sample weight: 20 mg.
- A thin layer of the sample is produced using a film applicator (Elcometer 3570/1, UK).
- Possible wavelengths: 250 to 1000 nm with 10 nm steps.
- Maximum radiation density: 35 mW/cm²; in most of the spectral range more than 10 mW/cm².
- Possible applied current: -0.2 to 1 V (Ag/AgCl) with 0.1 V steps.

Usage/Services:

Characterization of powder semiconductor materials or thin films. The device is used for rapid prediction of the activity of photocatalysts at a given wavelength.





