

The use of Fourier transform infrared spectrometer for the measurement of Fourier Transform Photocurrent Spectroscopy (FTPS) has been recently reported and it is basis of this thesis. The main task of the thesis is extension of the FTPS to Surface Photovoltage (SPV) method. This method gives an unique possibility to evaluation of effective diffusion length L and effective surface recombination velocity (SRV) for thin or non-symmetrical semiconductor structures that can't be measured by standard techniques. These parameters play key role in good performance of solar cells absorbers. The experiments were carried out on c-Si material with surface passivated by silicon nitride. Sample is illuminated from the passivated side and the SPV signal is detected between the back capacitive contact and non-illuminated ohmic contact. One-dimensional continuity equation is solved to fit the measured spectrum. We have to ensure linearity of measured signal versus incident light intensity and account for frequency dependence. One measurement takes 30 seconds - that enables arbitrary variations. The influence of surface barrier height on SRV was assumed and additional constant illumination (light bias) was used to investigate its behavior and new relations were found. Beside SPV new elegant technique for interference suppression in photoconductivity spectra is presented.