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Next – generation interdigitated back-contacted silicon heterojunction solar cells and modules by design and process innovations

NextBase - Deliverable report

D8.2 Report on optical characterization of comb finger shapes with guidelines for use by other WPs

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Publishable summary

The development of high-efficiency interdigitated back contacted silicon heterojunction solar cells requires a tool for precise measurements of thicknesses of passivating and doping fingers with thicknesses of only few nanometers. For this purpose, we have exploited an attenuation of Raman signal of the substrates by the thin, light-absorbing coatings. Using this approach, we have developed a new contactless thickness profilometry suitable for probing thin films deposited on smooth as well as on rough substrates. We have demonstrated its use to probe profiles of thin amorphous/microcrystalline silicon stripes deposited on rough silicon surfaces in structures exploited in high-efficiency silicon interdigitated back contacted heterojunction solar cells developed within the NextBase project. Our spatially resolved Raman measurements enable the thickness mapping of amorphous silicon over the whole active area of test solar cells with a very high precision: the thickness detection limit is well below 1 nm and the spatial resolution is down to 500 nm, limited only by the optical resolution. The method became a fundamental tool for developing the back contacting schemes within the NextBase consortium.