

Metrology for high throughput characterisation of nanowire energy harvesting devices

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Energy harvesting from renewable sources such as solar, heat and movement is a possible solution to create small amounts of electrical energy in areas which are difficult to access. Moreover, energy harvesting devices have much potential to address our energy problems. Nanowire (NW) based energy harvesting systems have achieved encouraging progress in the past years, but due to nanometre dimensions of the wires and large size up to several square metres of the devices, they also bring challenges for testing and characterisation. Nowadays, average properties of energy harvesting devices can be well measured, but a quantitative link and correlation between the performance of single NWs and that of the overall device is lacking.

To overcome these critical problems and to further promote the development and applications of NW energy harvesting devices, we have therefore initiated this EMPIR project entitled “Metrology for nanowire energy harvesting devices”. This research project is supported by the European Union and is funded within the scope of the European Metrology Programme for Innovation and Research (EMPIR). This project runs from September 2020 to August 2023. Eight national metrology institutes and 7 international academic and industrial partners are involved in this project, which aims to develop reliable and high throughput metrology for the quality control of NW energy harvesting systems, especially for high throughput nanodimensional, electrical, nanomechanical and thermoelectrical characterisation of NWs down to 50 nm diameter,

These objectives will require large-scale approaches that are beyond the capabilities of individual research labs and National Metrology Institutes. To enhance the impact of the research, the involvement of the appropriate user community such as industry, standardization and regulatory bodies is intended, both prior to and during methodology development.

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