



Master-Arbeit

Plasma diagnostics of magnetron sputter epitaxy processes

In collaboration with the Fraunhofer FEP the Institute of Solid State Electronics is developing a new variety of magnetron sputtering to expand its use in semiconductor manufacturing.

As the process window for such process window is limited it is important to measure different experimental parameters to control the process. Ideally the measured parameters do not depend on the specific design of a particular growth tool so that processes can be transferred between tools of different vendors without the need for long optimization. Plasma diagnostics do provide information about such parameters and are key to mastering magnetron sputter epitaxy.

The aim of this work is to use a suite of different plasma diagnostics to determine plasma and discharge parameters of magnetron sputter epitaxy processes for the growth of III-nitride semiconductors. These results will be correlated with the quality of films grown under different discharge conditions to get a better understanding of magnetron sputter epitaxy processes in general.

Provided that the experiments are successful, the results will be submitted for publication in a scientific journal.

Tasks

- Literature search regarding existing data sets and their relevance for the investigated processes and diagnostics
- Measurements with different diagnostics, for example:
 - Retarding field analyzers
 - Impedance probes
 - Calorimetric probes
 - Optical emission spectroscopy
- Correlation of plasma and discharge parameters with film quality

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