

ZAE Bayern is a research institute situated in Erlangen. Our field of research is “Renewable Energies”. We offer at the earliest possible date at our group “Solar Fab of the Future” in Nuremberg:

**Master thesis**  
**Development of solution processed packaging materials based on**  
**glass flakes and synthetic clay for protection of printed organic photovoltaics (OPV)**

Printed organic photovoltaics degrade mainly in the presence of water vapor and oxygen. In order to achieve sufficiently long lifetimes of OPV devices, they need to be packaged in high quality barrier materials with low permeabilities for water and oxygen. Barriers with ultra-low permeation values are usually obtained by vapor deposition techniques. However, these are relatively expensive. In order to reduce production costs of OPV modules, we aim at the development of barriers which can be applied to OPV devices in roll-to-roll compatible coating processes.

In this work, glass flakes or synthetic clay will be introduced as filler material in polymeric matrices to develop novel packaging materials based on the “tortuosity effect”. The resulting barrier materials will be characterized with respect to their moisture and oxygen permeabilities. In a further step, the most promising barrier materials will be coated directly on OPV devices. The lifetimes of the packaged devices will be determined in accelerated lifetime tests. The correlation of the measured lifetimes with the barrier properties will form the basis for further improvement of the barriers.

**Qualifications:**

- Student of material science, mechanical engineering, process engineering, chemistry or comparable
- Proficiency in chemical lab techniques

The thesis can be written in German or English and can be started as soon as possible.

Send your application including references to: [anja.kottlowski@zae-bayern.de](mailto:anja.kottlowski@zae-bayern.de)

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**Please note:** Your application will be treated confidentially. By applying for a position at ZAE Bayern you agree that the human resource department is entitled to forward your application to the responsible contact person in-house.

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All personal data will be deleted after the recruiting process is finished and the position has been filled.