

Term project, master's thesis

Investigation of pressing processes of resin and structured layers in microelectronics

In addition to many other industries, fiber composite structures are increasingly used in microelectronics. In the production of printed circuit boards (PCBs), which are used in almost all modern electrical devices, fabric-reinforced resin layers are pressed with structured layers. This process is difficult to monitor, therefore the flow of resin into microstructures during manufacturing is to be investigated with the help of finite element simulations.

Within the scope of a student's thesis, a simple test setup for the pressing of resin layers into microstructures is to be created. The experiment is then to be modelled in the Abaqus simulation software in order to validate existing resin material models as well as the simulation methodology as a whole. Within this simulation framework, the "Coupled-Eulerian-Lagrange" method is a promising approach for the given task, which has only been little investigated in literature so far. A particular challenge is to predict the flow paths of resin as well as the total thickness of printed circuit boards at the end of the manufacturing process.

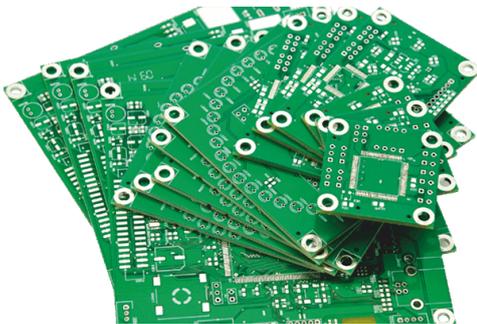
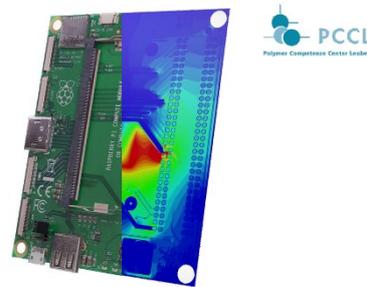


Figure: Manufacturing of PCBs



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Figure: PCB in reality and simulation

Focus of the thesis

- Create a test setup for the pressing of resin layers with structured layers (or adapt an existing one)
- Characterization of resin flow behaviour
- Set up a simulation model in Abaqus with the Coupled-Eulerian-Lagrange method
- Compare the results of experiment and simulation
- Validate and adjust existing material models for the investigated resin(s)

Requirements

- Profound knowledge in polymer engineering, machine engineering, science or related disciplines
- Good knowledge of English (knowledge of German is beneficial)
- Experience in working in a lab environment
- Interest and ideally experience with Finite-Element simulations (Abaqus)
- Initiative, good organizational skills (time management) and the ability to work in a team

Starting time: immediately

If you are interested or have any questions, just contact:
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