

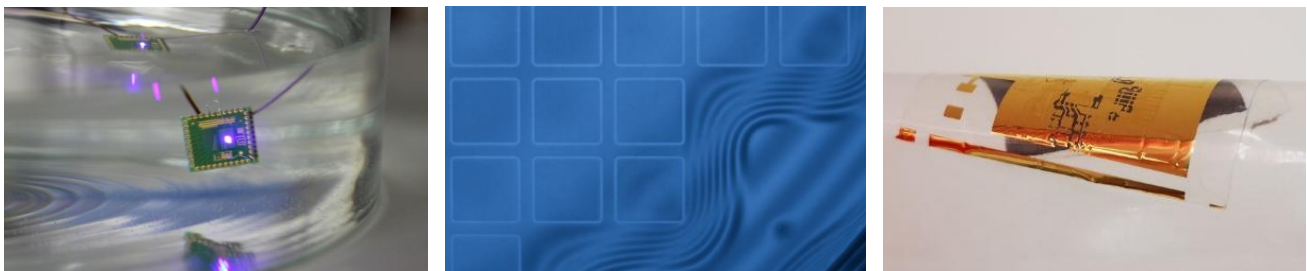
Invitation to Project Seminar Measurement,
Sensor and Embedded Systems

Parylene as an Advanced Material for Biocompatible Packaging – Encapsulation, Adhesive Bonding and Ultra-thin flexible Printed Circuit Boards

Abstract:

New applications such as Smart Everything, the Internet of Things, or Industry 4.0 are enabled by ongoing technology trends like further miniaturization and the increase of function density. Key enabler is the integration of advanced materials with superior properties. Parylene unites a unique combination of excellent properties, such as dielectricity, optical transparency, biocompatibility, barrier properties, chemical inertness against all common acids, bases and solvents, as well as sufficient mechanical stability even at low thicknesses $< 20 \mu\text{m}$.

The presentation aims to summarize the latest developments for the use of Parylene for packaging applications. This includes the encapsulation using the barrier properties of Parylene, the establishment of a process for adhesive wafer and chip bonding, as well as the realization of an ultra-thin and highly flexible printed circuit board based on Parylene for geometry adaptive sensors and medical wearables.



Parylene encapsulated electronics, Parylene adhesive bonding frames, and Parylene ultra-thin flexible PCB.

Speaker: M. Sc. Franz Selbmann, Group Leader “Flexible Devices” at the Institute for Nanoscale and Biobased Materials (INBM) at TU Bergakademie Freiberg / Research Associate System Packaging at the Fraunhofer Institute for Electronic Nano Systems ENAS

Place: SPQ-0302

Date: 27.11.2025, 2:30 pm

Audience: All interested members of TUBAF

- [1] F. Selbmann, M. Baum, C. R. Meinecke, M. Wiemer, H. Kuhn, Y. Joseph: “Low-Temperature Parylene-Based Adhesive Bonding Technology for 150 and 200 mm Wafers for Fully Biocompatible and Highly Reliable Microsystems”, ECS Journal of Solid State Science and Technology, 10, 074010, 2021, DOI: 10.1149/2162-8777/ac12b6
- [2] F. Selbmann, F. Roscher, F. d. S. Tortato, M. Wiemer, T. Otto, Y. Joseph: “An ultra-thin and highly flexible multilayer Printed Circuit Board based on Parylene”, Smart Systems Integration Conference (SSI), online, 27-29 April, 2021, DOI: 10.1109/SSI52265.2021.9466996