

PECVD of Diamond-like Carbon Layers



References

- Bundesanstalt für Materialprüfung (BAM), Germany
- GfE Institute for Physical and Mechanical Technologies, Germany
- Exabyte Magnetics, Germany
- S.T.S., Saudi Arabia
- Roth & Rau AG (job coating division)
- Anonymous (2x)

MicroSys 500 PECVD Process Equipment for Diamond-like Carbon Layers

Features

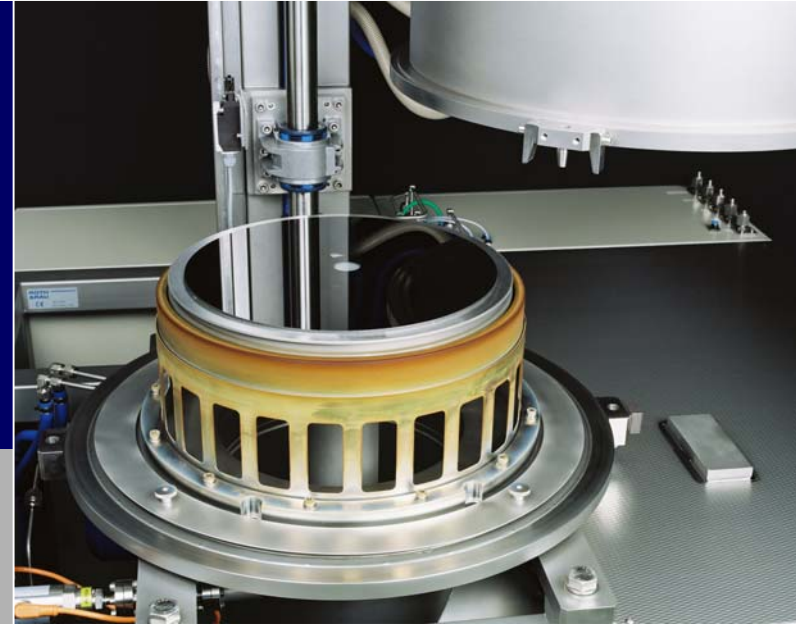
- 300 mm process system for **plasma enhanced chemical vapour deposition**
- suitable for deposition of **diamond-like carbon (DLC) layers for optical application**
- 13,56 MHz **parallel plate** arrangement
- **PC controlled** automatic operating system



MicroSys 500 PECVD Process Equipment for Diamond-like Carbon Layers

Process

- C_2H_2 or CH_4 based PECVD process
- **Water cooled** substrate electrode, deposition diameter 300 mm
- **Batch size:** 61 substrates of 30 mm diameter
- **Deposition rate:** $\sim 1 \mu\text{m/h}$
- **Batch time:** 120 min for $1 \mu\text{m}$, 180 min for $2 \mu\text{m}$ film thickness
- **Chamber cleaning:** oxygen plasma cleaning / mechanical cleaning



Diamond-like Carbon Layers

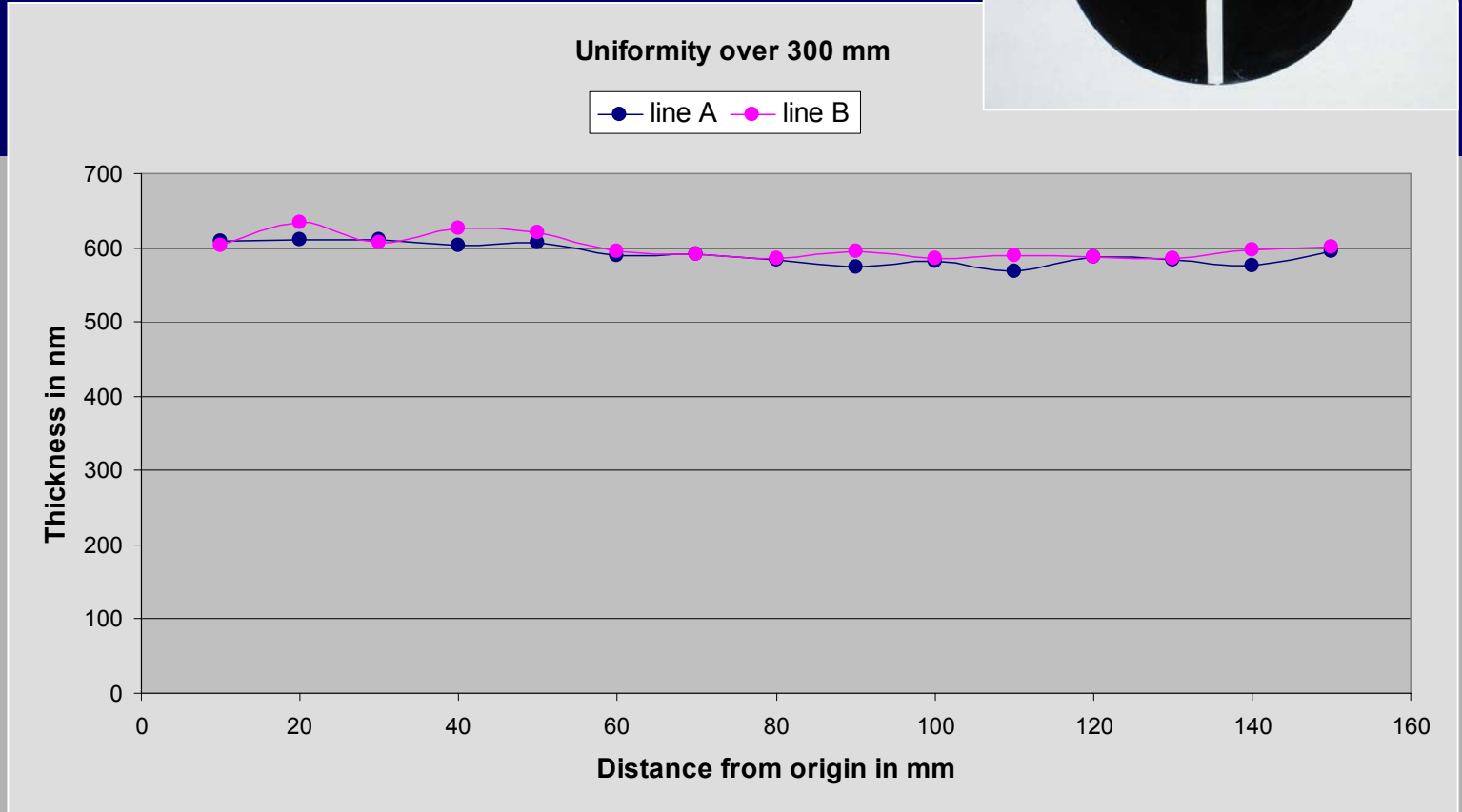
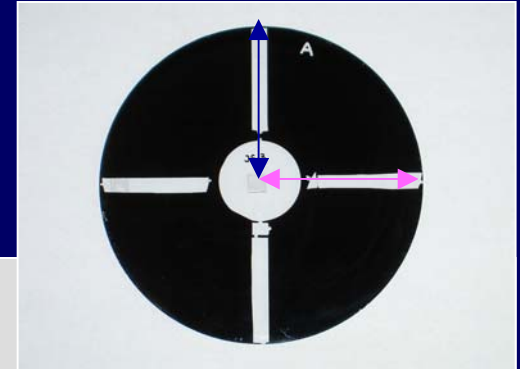


Properties

- **Hardness** > 3000 VH, **E-module** > 300 Gpa
- Passed tests according to following military standards:
 - **Adherence** (MIL-M-13508C)
 - **Abrasion** / 40 stroke (MIL-C-675C)
 - **Salt spray**, 24 h at 16 – 32°C (MIL-STD-810F)
 - **Temperature**, -62°C and 71°C, 5h each (MIL 13508 C)
 - **Humidity**, 24 h at 49°C / 95% - 100% rel. humidity (MIL-C-48497)
 - **Chemical attack**, 10 min HCl (0,1 n) at room temperature

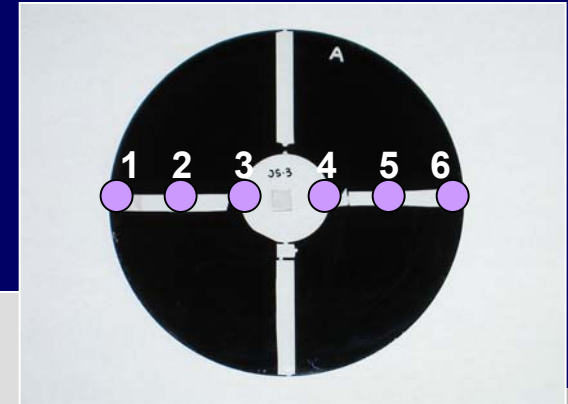
Diamond-like Carbon Layers

Film thickness uniformity

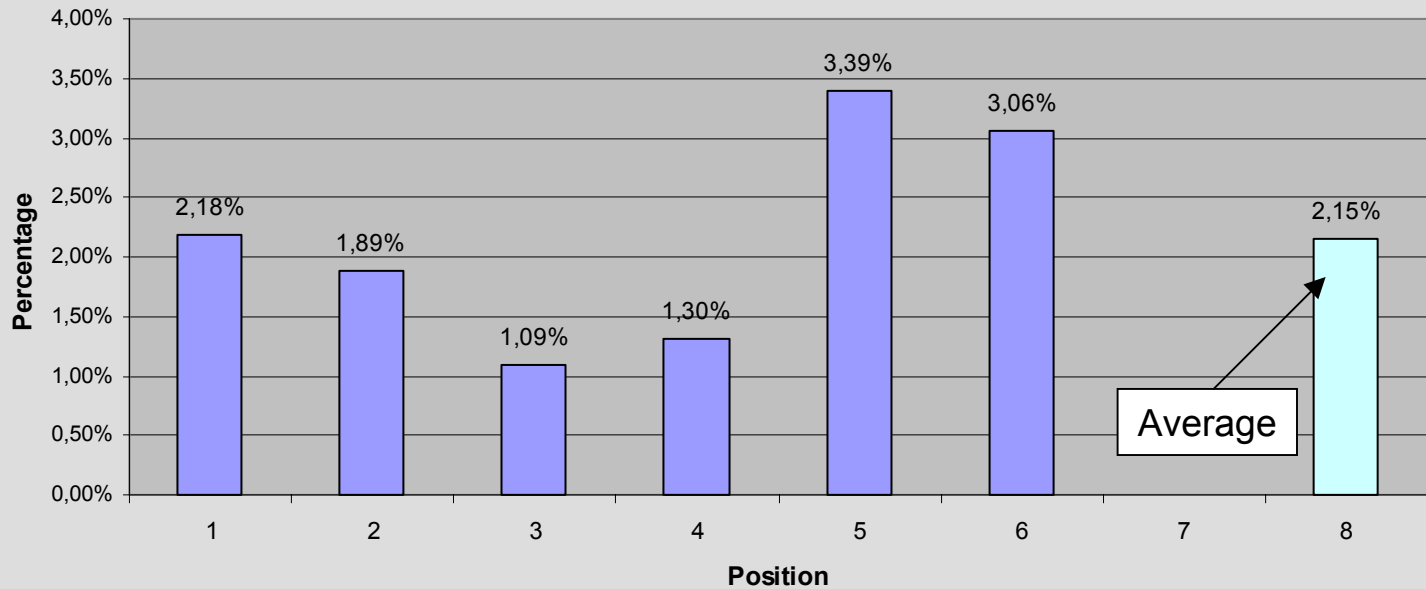


Diamond-like Carbon Layers

Film thickness uniformity



Deviation of the thickness on single substrates



Diamond-like Carbon Layers

IR Transmission

Transmission spectrum of DLC coated (one and double side) Ge substrates in center and margin positions

