

epiluvac



30 years of Silicon Carbide
Roger Nilsson, CTO

The Swedish supplier of Silicon Carbide CVD systems

- Based in Ideon Science Park, Lund, Sweden
- 30 years of history building SiC CVD systems
- Building R&D and production systems for a global market
- Next generation systems for demanding epitaxial processes – the **most advanced SiC CVD system** on the market



Building Silicon Carbide systems since 1993

- Delivered first SiC system 1993 to IMC, Kista
- Started as Epigress in 1993. Relunched as Epiluvac in 2013



Dr Lennart Ramberg at IMC measuring a 4,5 kV rectifier (1995)



Dr Nils Nordell monitoring the process at IMC in the very first SiC CVD system (1994)

The prototype for the double tube SiC CVD system (1996)

- Double-tube CVD-system placed at Linköping university (ABB project)
- Process temperature 1650 C
- One tube for n-doping and one for p-doping
- This system is still supported and converted to a Ga_2O_3 system.

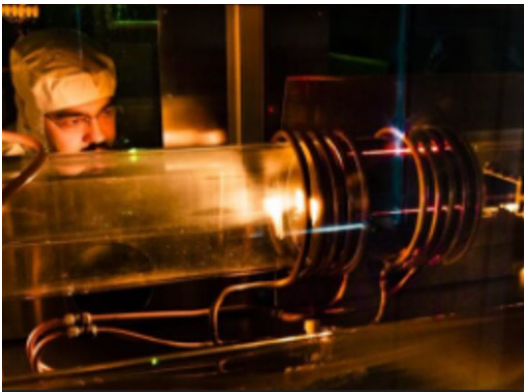
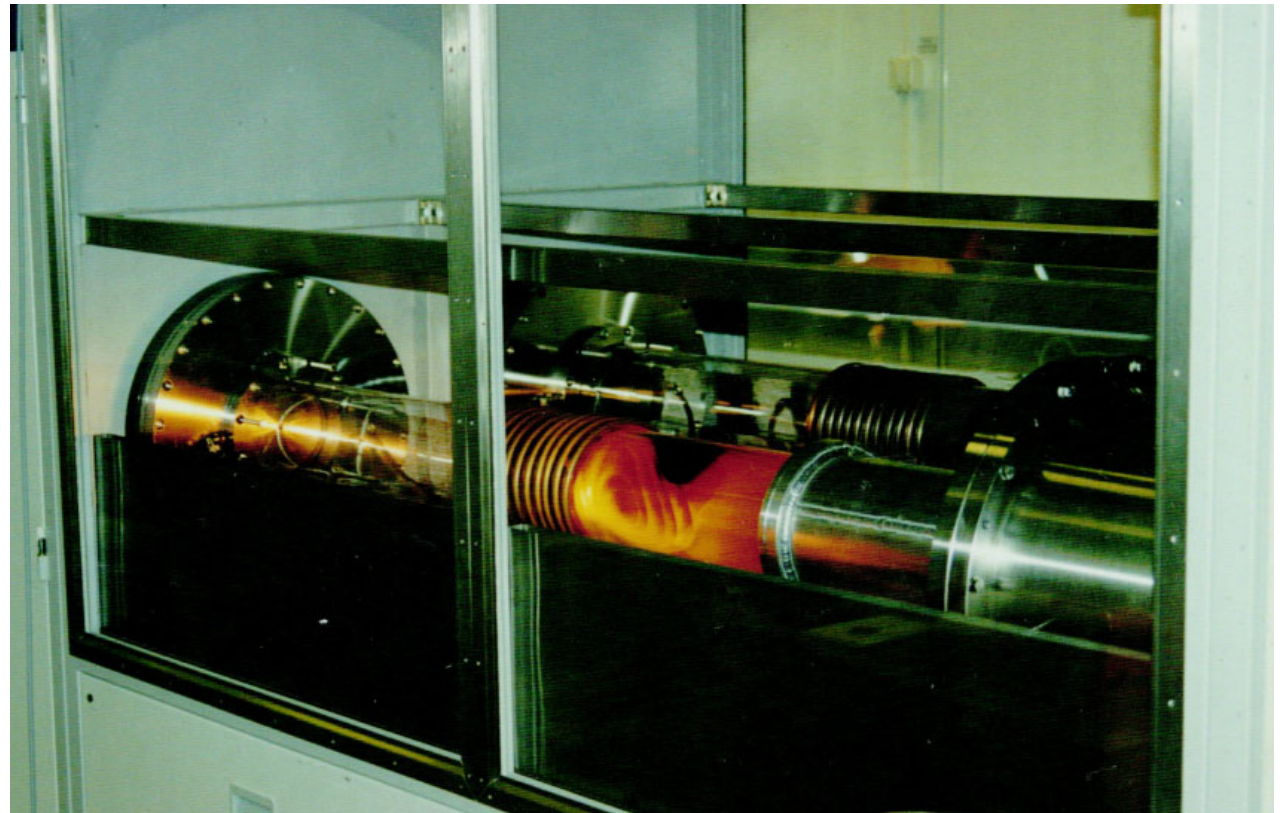


Photo:
LiU



World-wide success

- Double-tube systems were exported all over the world
- The de facto standard tool for SiC epitaxy development
- Strong support to the **Worldwide** SiC research community



Double tube system for IBM during production (2013)

Highlights

- PVT for bulk growth (1994)
- HT-CVD for bulk growth (1999)
- Graphene made in a CVD process was first done in a double-tube SiC system (2006) – **Noble Prize**



**PVT system
for bulk
growth**

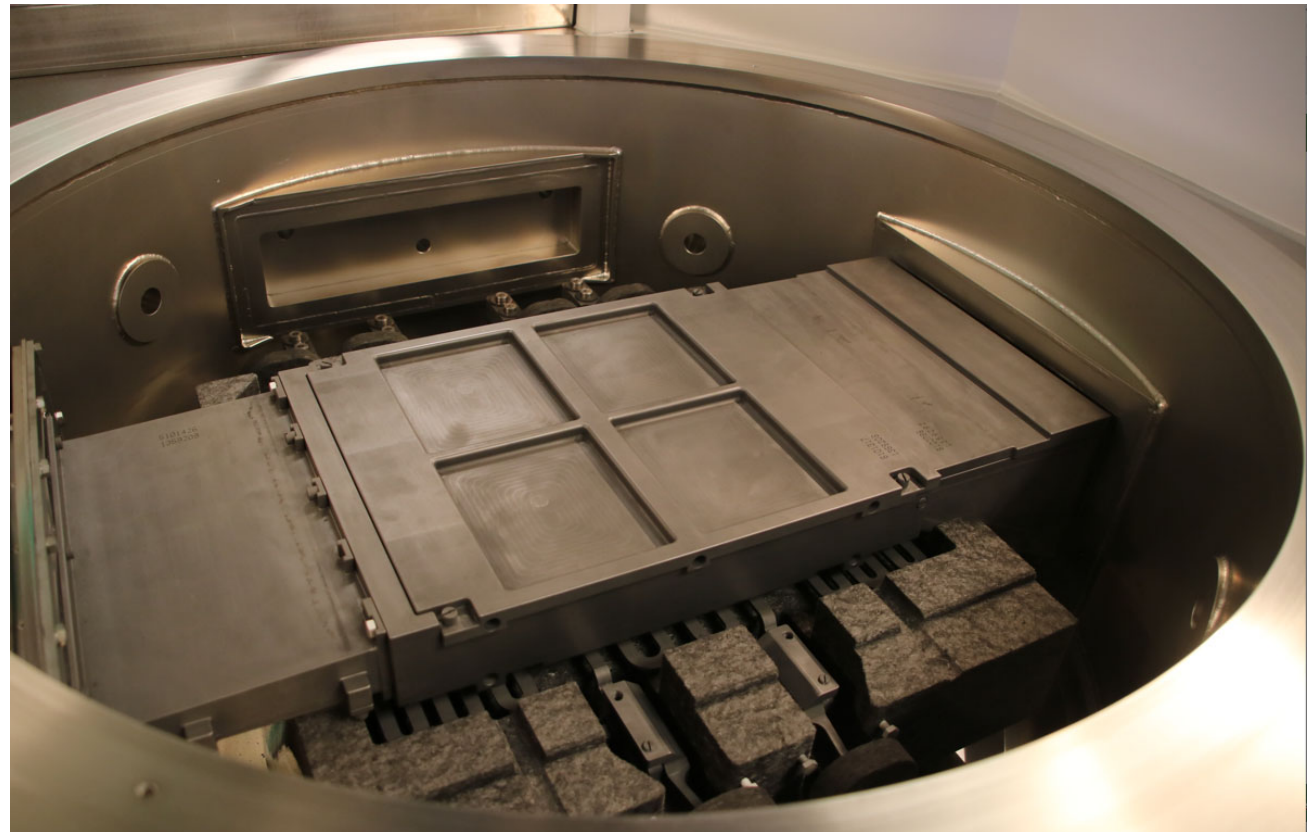


**Dr Włodzimierz Strupinski at the system where the first
graphene was made with a CVD process
(ITME, Poland)**



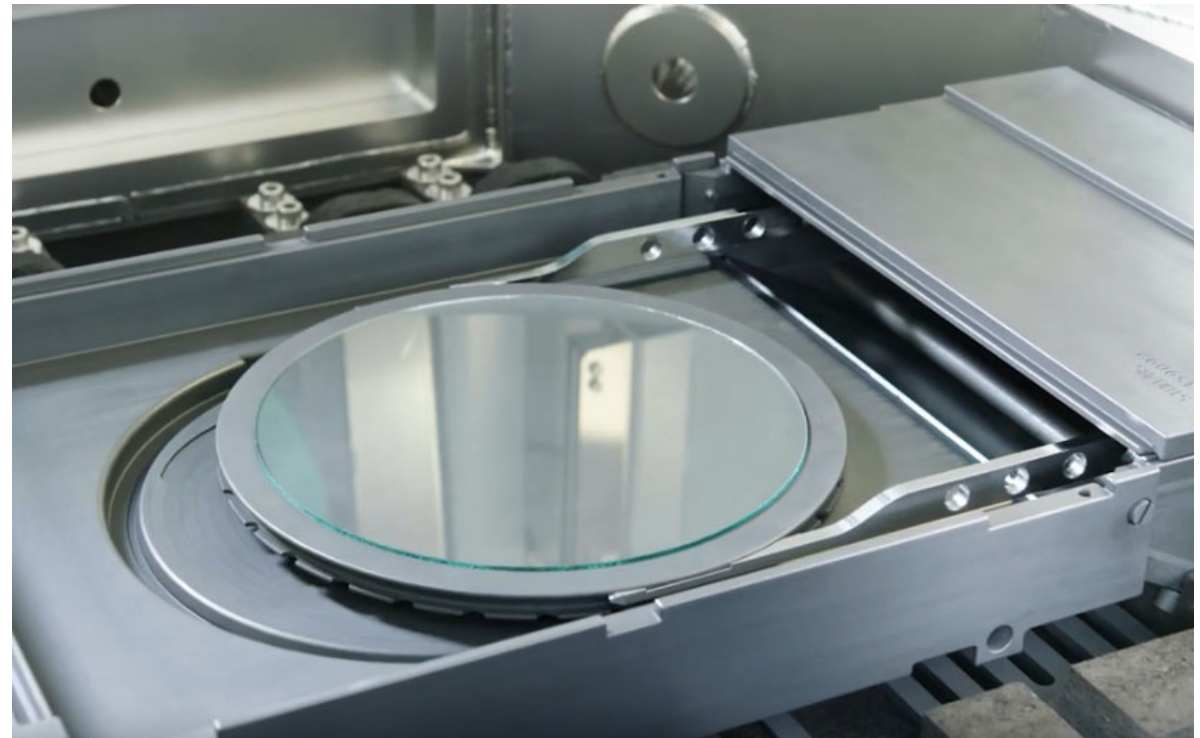
ER3 CVD systems – the 3rd generation

- 200 mm wafer diameter
- Extreme temperature uniformity
- Advanced gas injection for optimal growth and doping
- **Optimized cost** per good wafer
- Systems for SiC, nitrides and Ga₂O₃



ER3 CVD systems – the 3rd generation

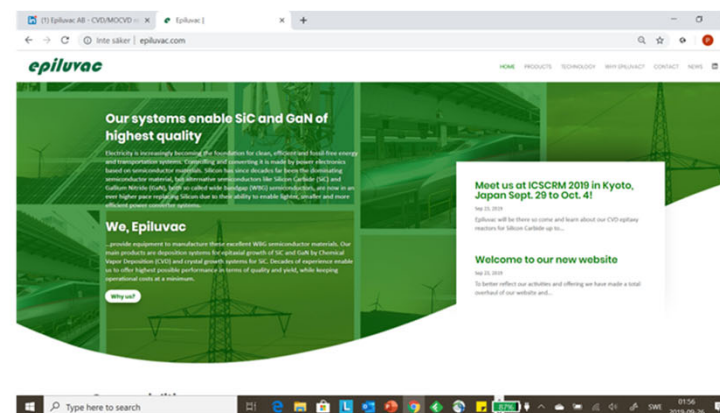
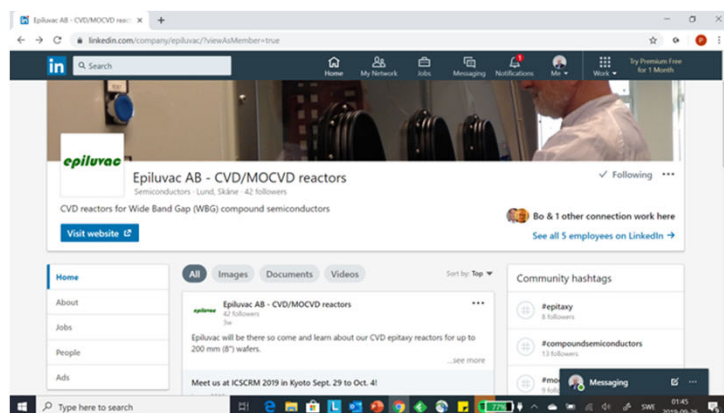
- Automatic wafer handler
- Hot-load of wafers up to 900 C
- High-volume production options
- Clustered systems with optimized process chemistry in each chamber



And in the future?

- Epiluvac will **continue** to support the Swedish SiC community
- Epiluvac will continue to provide state-of-the-art systems to the SiC industry worldwide
- Close collaboration with researchers at universities in order to have **next generation** technology
- The new ER3can meet the tightest uniformity requirements and wafer specifications
- Epiluvac expands rapidly with systems for cost efficient production – the **market** is there!





Thank you!

Roger Nilsson, CTO

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Watch the **movies** on YouTube – search "Epiluvac"