

Prof. Dr. S.E. Schulz

Seminar Questions Seminar 5:

Part 1 (remaining questions from Seminar 4: Etch

- 8) What are potential dry etching techniques? Please name the respective etching mechanisms and the achievable anisotropy!
- 9) Please draw a reactor for reactive ion etching and name the different parts!

Part 2: Overview Deposition Processes / CMOS Process flow and sub 100 nm technology

- 1) Name the four “gas phase deposition processes” used in advanced CMOS IC technology. For each of these processes give one example for a material/thin film deposited in front end technology in production and one example for a process module, where this material/thin film is applied in production!.
- 2) Process module “Poly Gate Structure”: What are the basic process steps and the materials used?
- 3) What is the motivation to use high-k/metal gate (HKMG) structures instead of conventional SiO₂/poly Si gate structures? Name the two technology approaches for HKMG applied in production! Describe the process flow of the process module “HKMG – gate last” by naming the five steps of its realization!
- 4) What are the benefits of silicon on insulator technology relative to conventional silicon bulk technology?
- 5) What is the motivation to use local stress/strain generation / strained silicon in CMOS transistors? Which type of strain do you need to enhance the NMOS and PMOS transistor, respectively? Name two approaches for local stress generation in CMOS transistors!