Exercise 2.6-1

All Quick Questions / Class Exercises to

2. Semiconductor Materials and Products

Subchapter 2.1: General Chemistry and Structure

- Ponder the history of "***LCD***" flat panel displays.
- Why does the world need saving? How shall it be done?
- Why do we use crystals, preferably single crystals, preferably "perfect" single crystals in case of doubt?
- Supply examples for critical parameter - component couplings.
- What makes a semiconductor interesting for technology?
- How would you like your bandgap, Sir?
- What does it mean to dope a semiconductor in reality?
- Come up with **2 - 3** examples where product requirements transfer to shape / structure requirements.
- Can you still afford it if your present product is hugely successful? - What could that mean?
- Provide examples (and criteria) for the products listed

Subchapter 2.2: Silicon

- What is the approximate lateral size of *one* transistor in an **IC**?
- Why are there no **16 GB** memory chips *now*.?
- What properties should a semiconductor have for making **IC**'s?
- What exactly produced complexity and market growth rates of **30 %** for more than **30** years (for **Si IC**'s)?
- Where will it end?
- What do you know about **MEMS**?
- Are there any other uses of **Si** you know off (or can find quickly)?

Subchapter 2.3: III-V Semiconductors

- What band gaps of which type would we like to have for **III-V** properties?
- What are the requirements for substituting light bulbs by **LED's**? Compare your answers to the list in the script.
- What are the requirements for substituting light bulbs by **LED's**? What is the state of the art?
- Amend and discuss the list of optoelectronic products given so far.

Subchapter 2.4: Other Semiconductors and Products

- What are the strengths an weaknesses of **Ge**?
- Why is **SiC** both very desirable and very difficult as a semiconductor material?
- What are **II-VI** semiconductors and *chalcogenides*= Why are these materials of some interest?
- Name at least two important semiconductors of the above groups and what they are used for.
- What are *organic semiconductors* and their important uses?