

History of SiC

Advanced

- ▶ In contrast to diamonds, **SiC** is never found on *this* world (and thus never became a valued gemstone in the past). Only in fragments of *other* worlds (i.e. meteorites), on occasion contain **SiC** as has been found by **Moissan** in **1905**. Mineralogists thus call "natural" **SiC** "**Moissanite**".
- It was **Berzelli**, who in **1824** first observed (man-made) **SiC**. But it was not before the invention of the electric furnace by E.H. and A.H. **Cowles**, and its application to carbon compounds by **Acheson** around **1885**, that **SiC** came into focus as a useful material.
 - Acheson was actually looking for a material that could replace expensive diamonds needed for cutting and polishing purposes. "**Carborundum**", the fine-crystalline **SiC** stuff, made it big and is still much used today. The name was a take off on "**Corundum**", the mineralogists name for Aluminumoxid, **Al₂O₃**.
- ▶ In the "Acheson reactor" on occasion relatively large single crystals could be found in voids and channels formed during processing.
- Checking such a crystal for possible uses as a "crystal" in the early "crystal detector radios", H.J. **Round** noticed (and described in a paper) that cold light was emitted from the **SiC** - metal point-contact structure. This was the very first description of a **LED**! Of course, Round did not, and could not understand what he saw.
 - In **1912** H. **Baumhauer** discovered the polytypie of **SiC** - not a mean feat at this date!
- ▶ In **1955**, **Lely** made the next big step in inventing the "[Lely growth method](#)" which is still used nowadays to some extent. This really triggered the use of **SiC** as an electronic material.
- ▶ Let's just look at some of the more interesting dates in the development of **SiC** as an electronic material:
- - **1958** First **SiC** conference in Boston
 - **1966** First **MOS** transistor (H.R. Phillip, E.A. Taft)
 - **1977** Development of the modified Lely growth technique by Yu.M. Tairov; producing first commercially interesting single **SiC** crystals.
 - **1977** First commercial **LED** based on **SiC** from V.F. Tsvetkov at Siemens (not a big success, quote from the Net: "*The first original commercially successful blue (SiC) LEDs (were) pioneered by Cree in the early 1990's. I have been advised that Siemens dabbled into the blue LED game as far back as the 1970's and produced working models, but my impression from seeing commercially successful products is that Cree is the first significantly commercially successful producer*")
 - **1978** First bipolar transistor (W. von Münch)
 - **1983** Heteroepitaxie of **SiC** on **Si** (S. Nishino, J.A. Powell, H.A. Will)
 - **1987** Cree Research Inc., the first commercial supplier of **SiC** substrates, was founded
 - **1989** 1 inch **SiC** single crystals
 - **1993** 2 inch **SiC** single crystals
 - **1994** 3 inch **SiC** single crystals
 - **1999** 4 inch **SiC** single crystals