

PVT process and apparatus for the safe production of single crystals

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In order to use hydrogen as a process gas in a PVT process, special safety measures are established to ensure that the process can be carried out safely.

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An apparatus for carrying out the PVT process consists of a highly heatable growth cell (1), which is arranged in a process chamber (4), the wall of which consists of a heat-resistant quartz glass. The process chamber (4) is filled with hydrogen via an inlet valve (5). A heating device (6) consists of an induction coil (7) which surrounds the process chamber (4) at the level of the growth cell (1) and heats the growth cell (1) to over 2,000 °C up to 2,400 °C.

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However, the use of hydrogen entails the problem that if the quartz glass of the process chamber (4) breaks, which cannot be completely ruled out, the hydrogen mixes with the oxygen in the ambient air, creating an ignitable gas mixture that would immediately ignite on the hot parts of the apparatus.

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The process chamber (4) is therefore surrounded by a containment vessel (8), which is filled with an inert gas.

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(Figure 1)