Claims:

1. Method (200) for obtaining information in realtime from a crystal growth process or crystal growth system (2, 4) in a high temperature environment, such as for growing a silicon carbide crystal (52), the method comprising the steps:

arranging (210) a crystal or crystal seed in a hot zone (55) of said crystal growth system,

hermetically sealing (220) said hot zone,

providing (230) a probing signal by means of a signal generator (26) and directing said probing signal onto a first surface (53) of said crystal inside said hot zone,

analysing (240) a signal response and retrieving at least one process status or process development information.

2. The method (200) according to the preceding claim,

comprising at least one of the additional steps

coupling (215) a coupling rod (28) to said signal generator (26) and/or

transporting (232) said probing signal by means of said coupling rod into said hot zone, and/or

positioning (216) said coupling rod such that it is in direct contact with said first surface (53) of said crystal (52).

3. The method (200) according to claim 1,

comprising at least one of the additional steps

arranging (211) the signal generator (26) spaced apart from said first surface (53) of said crystal (52), in particular outside of said hot zone (55), and/or

directly coupling said probing signal from the signal generator (26) into said coupling rod (28) and transporting said probing signal into the hot zone (55) and onto said crystal (52) by means of said coupling rod, and/or

coupling said probing signal, for example directly, into the first surface (53) of said crystal (52).

4. The method (200) according to claim 1,

comprising at least one of the additional steps

arranging an ultrasound transducer (26) at an outer end (28a) of said coupling rod (28) as defined in claim 2,

generating said probing signal by means of at least one active element, such as an ultrasound transducer arranged outside the hot zone (55); and/or

wherein performing the method is done as a non-disturbing measurement.

5. The method (200) according to claim 1,

wherein process development information can be retrieved out of process status information, and/or

wherein process development information includes at least one of a cristallization front determination or a crystal growth rate, and/or

wherein process status information includes at least one of a number or distribution of defects in the crystal or crystal thickness.

6. The method (200) according to claim 1,

including at least one of the steps

receiving a probe signal that is returned, for example, from a second surface (54) of the crystal (52), and/or

performing a time-of-flight measurement of the probing signal; and/or

wherein using said probing signal comprises imposing waves, for example ultrasound waves, on said first surface (53) of said crystal(52).

7. The method (200) according to claim 1

further including at least one of the additional steps

while the hot zone (55) is hot or heated, cooling said coupling rod (28) by means of a cooling device (25);

cooling said signal generator (26), e.g. by means of a cooling device, such as by immersion into a cooling channel (22);

determining a temperature profile over the coupling rod (28); and/or

estimating or correcting a temperature effect on the propagation speed of said probing signal or of said reflected probe signal.

8. Use of the method (200) according to claim 1 during the making of a silicon carbide monocrystal (52).

9. Realtime measurement system (12) for obtaining information in realtime from a crystal growth process or crystal growth system (2, 4) in a high temperature environment, such as for growing a silicon carbide crystal (52), comprising

a hermetically sealable hot zone (55) for arranging a crystal (52) or crystal seed in said hot zone of said crystal growth system,

an active element (26) such as a signal generator outside said hot zone for providing a probing signal to direct said probing signal onto a first surface (53) of said crystal inside said hot zone,

analyzation means (26) for retrieving at least one process status or process development information.

10. The realtime measurement system (12) as defined in claim 9, further comprising at least one of a coupling rod (28) for transporting said probing signal onto said first surface (53) of said crystal (52),

wherein said probing signal is preferably directly coupled from the signal generator (26) into said coupling rod, and/or

wherein said active element (26) is arranged spaced apart from said first surface (53) of said crystal (52), in particular outside of said hot zone (55).

11. The realtime measurement system (12) as defined in claim 9, the active element (26) further comprising

an ultrasound transducer at an outside end (28a) of said coupling rod (28) defined in the preceding claim, wherein said ultrasound transducer is preferably adapted for generating said probing signal and, more preferably, for directly coupling said probing signal into said coupling rod, and/or

wherein the analyzation means (26) are adapted to analyse a signal response, such as one or more ultrasound waves.

12. The realtime measurement system (12) as defined in claim 9,

wherein the active element (26) is adapted to send and receive an ultrasound signal, and/or

wherein the ultrasound transducer is designed as a transceiver, and/or

wherein the active element (26) comprises a ceramic, such as a ceramic piezoelectric transducer, and/or comprises PVDF, preferably in the form of a foil.

13. Sensor arrangement (12) for a realtime measurement system (12) according to claim 9, the sensor arrangement comprising

a hot furnace entrance channel (20) that connects from an outside (10) into said furnace and comprising an interior section (21) that is arranged inside said furnace, wherein the interior section extends for example from an outer furnace wall (6) until an insulation layer (8) around a hot zone housing (50),

a measurement device (26) arranged in said interior section of said entrance channel to measure data from an inside of a hot zone,

a cooling device (25) that is at least partly arranged in said entrance channel to provide cooling for said measurement device.

14. The sensor arrangement (12) according to the preceding claim, further comprising at least one of

a hot zone housing (50) inside said hot furnace (2, 4) for housing said hot zone (55),

an insulation layer (8) on the outside of said hot zone housing; and/or

wherein said entrance channel (20) comprises a hot zone outlet (30) in said interior section (21) for providing a through connection into said hot zone (55).

15. The sensor arrangement (12) according to the preceding claim,

further comprising a coupling rod (28) arranged at least partly in said hot zone outlet (30), and/or

wherein said measurement device (26) extends from said entrance channel (20) through said hot zone outlet (30) and into said hot zone (55), and/or

further comprising a passage seal (32) at a hot zone end of the entrance channel (20) or at said hot zone outlet (30) for sealing said hot zone outlet, and/or for allowing for movement with respect to said entrance channel and/or said coupling rod (28).