CLAIMS

1. A system (100) for producing an epitaxial monocrystalline layer on a substrate (20) comprising:

an inner container (30) defining a cavity (5) for accommodating a source material (10) and the substrate (20);

an insulation container (50) arranged to accommodate the inner container (30) therein;

an outer container (60) arranged to accommodate the insulation container (50) and the inner container (30) therein; and

heating means (70) arranged outside the outer container (60) and configured to heat the cavity (5),

wherein the inner container (30) comprises a plurality of spacer elements (320) arranged to support the substrate (20) at a predetermined distance above a solid monolithic source material (10), wherein each spacer element (320) comprises a base portion (321) and a top portion (322), wherein at least part of the top portion (322) tapers towards an apex (323) arranged to contact the substrate (20).

2. The system according to claim 1, wherein the top portion (322) tapers from the base portion (321) to the apex (323).

3. The system according to claim 2, wherein the spacer elements (320) have a shape chosen from a pyramid, a cone, a tetrahedron and a prism.

4. The system according to any one of the preceding claims, wherein each spacer element (320) has a height (H), and the base portion has a transverse width (D), wherein the ratio between the height (H) and the transverse width (D) is from 1:3 to 3:1.

5. The system according to claim 4, wherein the height (H) of each spacer element (320) is about 0.7–1.4 mm and the transverse width (D) is smaller than or equal to 2.5 mm.

6. The system according to any one of the preceding claims, wherein a ratio between a surface area of the apex (323) and a surface area of the base portion (321) is from 1:1000 to 1:5.

7. The system according to claim 6, wherein the surface area of the apex (323) is about 100 μm^2.

8. The system according to any one of the preceding claims, wherein the spacer elements (320) are regularly distributed about the circumference of the substrate (20).

9. The system according to any one of the preceding claims, wherein the spacer elements (320) are made of tantalum, niobium, tungsten, hafnium, silicon carbide, graphite and/or rhenium.

10. The system according to any one of the preceding claims, wherein the inner container (30) is cylindrical having an inner diameter in the range 100–500 mm, preferably 150–300 mm, and wherein the substrate (20) and the source material (10) are disk-shaped.

11. The system according to any one of the preceding claims, further comprising a heating body (40) made of high-density graphite arranged below the inner container (30).

12. The system according to any one of the preceding claims, wherein the surface area of the source material (10) is greater than or equal to the surface area of the substrate (20).

13. The system according to any one of the preceding claims, further comprising a carbon getter (300) arranged in the inner container (30).

14. A method of producing an epitaxial monocrystalline layer on a substrate (20) comprising:

- providing (S100) an inner container (30) defining a cavity (5) for accommodating a source material (10) and the substrate (20);
- arranging a solid monolithic source material (10) in the cavity (5);
- arranging (S104) the substrate (20) at a predetermined distance above the source material (10) by using a plurality of spacer elements (320), wherein each spacer element (320) comprises a base portion (321) and a top portion (322), wherein at least part of the top portion (322) tapers towards an apex (323), arranged to contact the substrate (20);
- arranging the inner container (30) within an insulation container (50);
- arranging the insulation container (50) and the inner container (30) an outer container (60);
- providing heating means (70) outside the outer container (60) to heat the cavity (5);
- evacuating (S106) the cavity (5) to a predetermined low pressure;
- introducing (S108) an inert gas into the cavity (5);
- raising (S110) the temperature in the cavity (5) to a predetermined growth temperature by the heating means (70);
- maintaining (S112) the predetermined growth temperature in the cavity (5) until a predetermined thickness of the epitaxial monocrystalline silicon carbide layer on the substrate (20) has been achieved; and
- cooling (S114) the substrate (20).

15. The method according to claim 14, wherein the spacer elements (320) are regularly distributed about the circumference of the substrate (20).