CLAIMS

1. A method for producing a silicon ingot by the horizontal magnetic field Czochralski method, the method comprising:

rotating a crucible containing a silicon melt, the crucible having a wettable surface with a cristobalite layer formed thereon at more than two revolutions per minute, the cristobalite layer having a thickness of more than 0.25 mm;

applying the horizontal magnetic field to the crucible;

contacting the silicon melt with a seed crystal; and

withdrawing the seed crystal from the silicon melt while rotating the crucible at more than two revolutions per minute to form the silicon ingot.

2. The method of claim 1, wherein the crucible comprises a natural sand crucible.

3. The method of claim 2, wherein the method further comprises:

adding solid-phase polycrystalline silicon to the natural sand crucible; and

heating the polycrystalline silicon to form the silicon melt.

4. The method of claim 3, further comprising adding a melt modifier to the natural sand crucible to form the cristobalite layer on the wettable surface of the natural sand crucible.

5. The method of claim 4, wherein adding a melt modifier comprises adding the melt modifier while heating the polycrystalline silicon to form the silicon melt.

6. The method of claim 4, wherein adding a melt modifier comprises adding the melt modifier after the silicon melt has been formed.

7. The method of any of claims 4 to 6, wherein adding a melt modifier comprises adding barium carbonate ($BaCO_3$).

8. The method of claim 7, wherein adding barium carbonate comprises adding more than 1.7 grams per square meter of the wettable surface of the natural sand crucible.

9. The method of any of claims 4 to 6, wherein adding a melt modifier comprises adding one of barium oxide (BaO) or strontium carbonate ($SrCO_3$).

10. The method of claim 9, wherein adding one of barium oxide or strontium carbonate comprises adding one of

barium oxide or strontium carbonate in an amount substantially equivalent to 1.7 grams of barium carbonate per square meter of the wettable surface of the natural sand crucible.

11. The method of claim 3, wherein adding solid-phase polycrystalline silicon to the natural sand crucible comprises adding solid-phase polycrystalline silicon to a natural sand crucible having a barium based coating already formed on the wettable surface of the natural sand crucible.

12. The method of any preceding claim, wherein rotating a natural sand crucible comprises rotating the natural sand crucible at more than two revolutions per minute.

13. The method of any preceding claim, wherein the cristobalite layer is greater than about 2.00mm thick.

14. A system for producing a silicon ingot, the system including a controller configured to produce a silicon ingot according to the method of any of claims 1-13.