ABSTRACT

CONTROLLING AGGLOMERATED POINT DEFECT AND OXYGEN CLUSTER FORMATION INDUCED BY THE LATERAL SURFACE OF A SILICON SINGLE CRYSTAL DURING CZ GROWTH

The present invention relates to a process for preparing a single crystal silicon ingot, as well as to the ingot or wafer resulting therefrom. In one embodiment, the process comprises controlling the growth velocity, v, and the effective or corrected axial temperature gradient, as defined herein, such that, within a given segment of the ingot, the ratio $v/G_{effective}$, or $v/G_{corrected}$, is substantially near the critical value thereof over a substantial portion of the radius of that segment, and controlling the cooling rate of the segment between (i) solidification and about 1250 °C, and (ii) about 1250 °C and about 1000 °C, in order to manipulate the effect of the lateral incorporation of intrinsic point defects therein, and thus limit the formation of agglomerated intrinsic point defects and/or oxygen precipitate clusters in a ring extending radially inward from about the lateral surface of the ingot segment. In this or an alternative embodiment, the axial temperature gradient and/or the melt/solid interface may be controlled in order to limit the formation of agglomerated intrinsic point defects and/or oxygen precipitate clusters in the ring.

FIG. 1A

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