SILICON WAFERS HAVING CONTROLLED DISTRIBUTION OF DEFECTS, METHODS OF PREPARING THE SAME, AND CZOCHRALSKI PULLERS FOR MANUFACTURING MONOCRYSTALLINE SILICON INGOTS

Abstract of the Disclosure

A silicon wafer is provided having controlled distribution of defects, in which denuded zones having a sufficient depth inward from the surface of the wafer are combined with a high gettering effect in a bulk region of the wafer. In the silicon wafer, oxygen precipitates, which act as intrinsic gettering sites, show vertical distribution. The oxygen precipitate concentration profile from the top to the bottom surfaces of the wafer includes first and second peaks at first and second predetermined depths from the top and bottom surfaces of the wafer, denuded zones between the top and bottom surfaces of the wafer and each of the first and second peaks, and a concave region between the first and second peaks, which corresponds to a bulk region of the wafer. For such an oxygen precipitate concentration profile, the wafer is exposed to a rapid thermal annealing process in a gas mixture atmosphere containing nitrogen (N_2) and argon (Ar) or N_2 and hydrogen (H_2), in a donor killing step during a wafering process.

Fig. 10

This Sheet Has Been Replaced

