

The invention relates to semiconductor technology, in particular to methods for producing semiconductor materials, in particular to unseeded growth of ZnO single crystals in a closed volume.

The process, according to the invention, consists in unseeded growth of ZnO single crystal in a closed volume, wherein the growth chamber is subjected to preliminary thermal annealing at a temperature of 900...1100°C for 12...72 hours to achieve a chemical equilibrium and hydrogen removal, is charged the ZnO mix material using chemical HCl transport agents, with an initial pressure at a growth temperature of 1...8 atm and the carbon, taken in the molar ratio necessary to meet one of the conditions: C:HCl=0.35...0.48 mol for the growth of crystals with nonpolar surface or C:HCl=0.5..0.58 for the growth of crystals with polar surface or C:HCl=0.6...0.75 mol for the growth of crystals with semi-polar surface. The single crystal growth is carried out at a temperature of 900...1100°C, with a temperature difference between the mix material and the growing crystal of 10...100°C, with a temperature gradient in the crystallization region of $\leq 20^{\circ}\text{C}/\text{cm}$ and with a cooling rate of the grown crystal of $\leq 100^{\circ}\text{C}/\text{hour}$.

Claims: 1

Fig.: 4