

Influence of the Composition of Solutions HNO₃-HI-glycerol on the Process of Chemical Etching of CdTe and Solid Solution Zn_xCd_{1-x}Te and Cd_xHg_{1-x}Te

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CdTe and solid solutions on its base have sufficiently wide practical use. There is need at first prepare accordingly there surface for made work items with used under named semiconductor materials for itch use chemical mechanic and chemical dynamic polishing (CDP).

There is used the methodic of rotating disk in order to develop and optimize new etching compositions with low rate of non-alloyed CdTe and solid solutions Zn_{0,04}Cd_{0,96}Te, Zn_{0,1}Cd_{0,9}Te and Cd_{0,2}Hg_{0,8}Te dissolution. The HNO₃ – 70%, HI – 57%, C₃H₈O₃ – 20 % aqueous solution have been used for the preparation of solutions (all the reagents are chemically clean). At first, the surface of the chemically treated semiconductors was washed in 0,2 M Na₂S₂O₃ solution for complete dissolution of iodine, and then it was washed in distilled water and dried out in the air.

On the basis of the obtained results, the structure of the polished etching compositions, as well as the techniques and modes of CDP for making the kind of semiconductor devices (table 1) have been developed and optimized.

Table 1

The structures of the polished iodine-educing compositions on the basis of HNO₃ – HI – Glycerin system for CDP (T = 298K, γ = 80 min.⁻¹)

Semiconductor	CdTe	Zn _{0,04} Cd _{0,96} Te	Zn _{0,1} Cd _{0,9} Te	Cd _{0,2} Hg _{0,8} Te
HNO₃ – HI – C₃H₈O₃, V. %	(5-25) : (55-95): (0-40)	(5-50) : (75-95): (0-40)	(15-25):(75-95): (0-40)	(5-25) : (60-95): (0-40)
Speed CDR, mkm/min	1-11	1-10	1-13	3-11

The given study of kinetic regularities of chemical digestion processes of Zn_xCd_{1-x}Te and Cd_xHg_{1-x}Te solid solution in etching solutions of HNO₃ - HI - Glycerin allowed to establish that the process of dissolution in the polishing compositions has a mixed nature, as the apparent activation energy is equal to 20-50 kJ/mol. It is confirmed by the speed of dissolution and dependence on the speed of rotation of the disk.

The developed iodine-educing etching compositions can be used for the CDP of under investigated semiconductor single crystals, whereupon the surface should be washed in the 0,2 M Na₂S₂O₃ solution and distilled water. In addition to that the surface is qualitatively polished (R_z ≤ 0,05mkm).