

LASER BEAM TECHNOLOGY AT PREPARATION OF NANOSIZED FIELD EMISSION CATHODES

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The semiconductor surface modification by laser beam is attractive for electron field emission cathodes formation. There are two possibilities for formation of asperities on the surface, namely: (i) the treatment of the semiconductor surface by power laser pulse that creates the micro- and nanosize protrusions and (ii) modification the properties of subsurface layer that influences on following treatments of the material.

In this work the influence of silicon surface modification by laser on properties the following porous silicon has been investigated. The intensity of laser beam was varied in range 0-150 MW/cm². Porous silicon layer was grown on laser modified silicon surface by electrochemical etching (HF:C₂H₅OH solution, J=10mA/cm², t=10 min). Investigation of porous silicon morphology by AFM method showed the significant influence of pre-etching laser modification on porosity of porous layer. Electron field emission from such prepared porous silicon has been investigated. Laser modification of silicon is perspective decision for formation separate sites of various porous silicon layers on one substrate.