

15th International Conference on
the Physics of Non-Ideal Plasmas
Almaty, August 30- September 4,
2015

QNP



Book of Abstracts

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Al-Farabi Kazakh
National University



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Influence of hydrogen plasma treatment on the electrical, optical and structural properties of ZnO:B thin films

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Currently ZnO is one of the most actively studied wideband ($\sim 3.37\text{eV}$) semiconductor materials. Large exciton binding energy ($\sim 60\text{ meV}$) does zinc oxide promising to create a new generation of light optoelectronic devices such as light-emitting diodes based on heterostructures [1] and homostructures [2,3].

In this paper the effect of plasma treatment on electrical parameters, optical transmission spectra, Raman spectra and photoluminescence (PL) spectra of ZnO:B samples prepared by MOCVD on glass substrates was studied.

A change in the electrical properties of the PL spectra of ZnO samples under thermal annealing in air and in vacuum and the effects of plasma treatment in hydrogen was found. A slight recovery of the carrier concentration, the resistivity of the samples and a sharp increase in the PL intensity was observed at a short-term treatment in hydrogen plasma. PL intensity increased about 100 times. This intensity increase of photoluminescence is related to the hydrogen passivation of nonradiative recombination centers such as impurity and structural defects.

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