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Summary of Phd thesis “**Development of a model of optical fiber sensor based on multimode interference structures made by ion-exchange process in glass"**

The research focused on the development of the optical sensor model, which uses in its operation the multimode interference phenomenon in gradient index waveguide. The purpose of the study is to demonstrate that "Changes in the field distribution, observed in gradient multimode interference waveguides made by K + - Na + ion exchange process, due to changes in external propagation conditions of the optical signal may be used for sensor systems".

Three main configurations were considered. The first configuration was based on multimode section, which was covered with a dielectric layer, which changed the value of the refractive index in case of its contact with the measured analyte. The second considered configuration had additionally a thin buffer layer of high refractive index disposed between the core of multimode section and dielectric sensing layer. The purpose of the buffer layer was to concentrate the energy field closest to the sensing layer and thus increase the impact of cover parameters changes on the propagating in the waveguide signal. The third configuration was based on the MMI section that is coated with a material which change the refractive index and extinction coefficient with changes in concentration of the analyte.