FABRICATION OF OPTICAL PLANAR AND CHANNEL WAVEGUIDES IN Yb^{3+} DOPED $KY(WO_4)_2$ BY HE-ION IMPLANTATION, C.N. Borca, F. Zäh, C. Schnider, R.P. Salathé, M. Pollnau, Advanced Photonics Laboratory, École Polytechnique Fédérale de Lausanne, 1015 Lausanne, Switzerland and P. Moretti, Laboratoire de Physico-Chimie des Matériaux Luminescents, Université Lyon 1, 69622 Villeurbanne Cedex, France.

Light ion implantation can be regarded as a universal tool for fabricating low-loss waveguide structures in optically active oxide materials. We have fabricated planar optical waveguides in $KY(WO_4)_2$:(2%)Yb^{3+} crystals by implanting He^+ ions at 1.5 MeV, with doses ranging from 1 to $3x10^{16}$ ions/cm^2. An optical barrier with a decreased effective refractive index was created at the end of the ions' tracks, situated approximately 3.5 µm below the surface. The change in refractive index with respect to the bulk value and its stability to thermal treatment were investigated by dark m-line spectroscopy.

Surface channel waveguides were obtained by writing sidewalls into the planar guiding layer by implantation through a slit. The sidewalls were produced by keeping the ion energy fixed and varying the incident angle of implantation. Channel waveguides of 5-µm width and 4-µm depth were obtained in the regions between the implanted sidewalls. Beam-propagation parameters were measured by investigating the output profile of end-coupled, fundamental-mode laser light at 980 nm. The results of loss measurements will be presented at the conference.