

### 3.2 Nonlinear Optical Susceptibilities of Ion-implanted KNbO<sub>3</sub>

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In order to investigate the effect of ion implantation on the nonlinear optical susceptibility we determined the depth profile of the nonlinear optical coefficient  $d_{33}$  in ion-implanted KNbO<sub>3</sub> waveguides. The measurements were done using reflected second-harmonic generation from angle-lapped samples. The generated second harmonic light was within the absorption band of KNbO<sub>3</sub> in order to obtain surface sensitivity.

We found that the nonlinear optical coefficient  $d_{33}$  is decreased to about 70% of the bulk value due to irradiation. This reduction is attributed to partial depolarisation of the material in the waveguiding layer. In order to restore the nonlinear optical coefficient to its original value, the crystals were reoled by applying an external electric field along the polar  $c$ -axis of the KNbO<sub>3</sub> crystals. Thereafter, the depth profile was measured again, and it was found that the  $d$ -coefficient reached over 90% of the bulk value after the repoling process. As a consequence the frequency doubling conversion efficiency of these ion-implanted waveguides can be increased by a factor of two by adequate repoling.