Analysing the influence of wall defect in lithium niobate ridge waveguide

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Abstract
In this research, the capability of the new approach of making ridge waveguides in lithium niobate by Argon physical etching and titanium diffusion is investigated. For this purpose, the proportion of light mode confinement in the ridge section is measured and simulated. Also, the effect of wall defects in ridge waveguide-which is a challenge of this kind of waveguides- in light power dissipation, is simulated. The ridge height of fabricated waveguide reaches 2.5 µm and the defects of ridge walls, that are the result of litography process and especially ligh mask, are measured to be about 200 nm on average. In this research, by simulation of titanium diffusion and refractive index distribution in the waveguide, it is demonstrated that although the defects exist in the ridge walls, by using appropriate diffusion depth of titanium, light power dissipation less than 3 dB/cm can be reached while mode confinement in the ridge section is more than 50 percent.

Keywords: lithium niobate, ridge waveguide, defect, titanium diffusion

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