

## Optimization of nanopores generated by chemical etching of swift-ion irradiated LiNbO<sub>3</sub>.

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The procedure to etch latent ion tracks in lithium niobate has been systematically investigated and optimized. The influence of some key parameters, etching acid, processing time, temperature, ion type, and stopping power, in the range from 3 to 33 keV/nm, has been monitored and elucidated. Several assisting techniques to improve the etching performance, such as ultrasonics, electric field and sample annealing have been examined. The morphology of the irradiated surface has been investigated by AFM, TEM and profilometry. The used fluences were in the range from  $10^8$  cm<sup>-2</sup> to  $10^{10}$  cm<sup>-2</sup>. Pore depths up to 100 nm and aspect ratios (depth/ diameter) up to 0.4 have been achieved. The occurrence of two etching regimes, *fast* and *slow*, having different morphologies (*circular* or *ellipsoidal*) has been identified and related to the core-halo structure for the latent tracks. Moreover, the role of pre-irradiation damage on the etching performance and pore morphology has been substantiated and discussed in terms of existing models of damage.

[1] A. García-Navarro *et al.*, *Nucl. Instr. and Meth.* **B249**, (2006) 172.

[2] J. Olivares *et al.*, *Appl. Phys. Lett.* (89), (2006) 071923.