

Abstract Submitted
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Surface electronic structure of positively and negatively poled single crystal lithium niobate after surface processes YANG SUN, WOCHUL YANG, GARY HEMBREE, ROBERT NEMANICH — This study focuses on the surface electronic structure of positive and negative domains of single crystals of lithium niobate. The surface is prepared by solvents cleaning, plasma and annealing process. Positively and negatively poled lithium niobate is cleaned by organic solvents followed by remote plasma exposure. XPS and PEEM are employed to characterize the change of the electronic structure. XPS show the O 1s and Nb 3d peaks shifted to higher binding energy after the plasma. Subsequent annealing to 200C results in the peaks at the initial binding energy. Also, PEEM images of polarity patterned surfaces display contrast between the domains that varies with the different surface treatments. After O-plasma exposure the negative domain is brighter than positive domain in the PEEM image. However, the domain contrast disappears and the overall emission intensity is reduced after annealing at 200C. These results indicate that the photo threshold of the domains is different after the surface treatments. Our results are discussed in terms of modification of the surface electronic structures by band bending and screening.

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