

Nanoindentation Studies of LiKB_4O_7 Single Crystals

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The LiKB_4O_7 single crystal is new promising material for application in non-linear optical and acousto-optic devices. Mechanical properties of LiKB_4O_7 , however, are little investigated, although they are obviously important for all kinds of device application. The present work is devoted to experimental studies of mechanical properties of the LiKB_4O_7 single crystals in [100], [010] and [001] crystallographic directions by means of nanoindentation.

The indentation tests were performed on „Nanoindenter G 200“, using a pyramidal diamond Berkovich indenter tip. The procedure is to apply load to indenter and record the depth of penetration. This is done on loading and unloading. The samples were measured with a maximum force of 100, 300 and 500 mN. The calculation was done according to the standard ISO 14577.

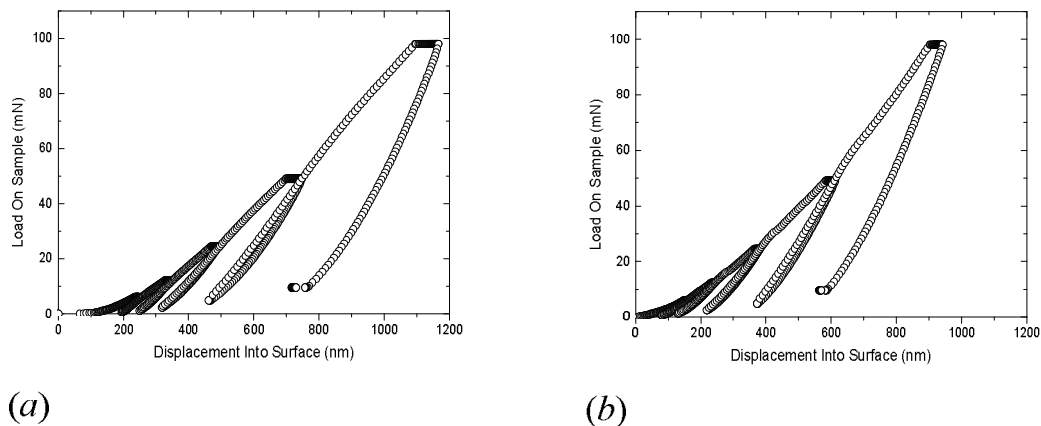


Fig. 1. Experimental load-displacement curves for (100) plane indentation (a) and (010) plane (b) of LiKB_4O_7 single crystal

From the resulting load-displacement curves (Fig. 1), the Young's modulus and hardness of the LiKB_4O_7 single crystals in all three directions have been determined. The orientation dependences of the Young's modulus are correlated with the available results of acoustic measurements of LiKB_4O_7 crystals.

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