

Growth and Improved Properties Single Crystal α -LiIO₃ Doped with Amino Acids

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Crystals with nonlinear optical, pyroelectric, piezoelectric, acousto-optical properties are widely used in various technologies. One of the essential crystals for technology is hexagonal modification of lithium iodate (α -LiIO₃). It has the above-listed properties [1]. In recent years studies have shown that doping a crystal with amino acids improves the non-linear optical properties of the crystal [2].

For the first time, such research for single crystals of α -LiIO₃ was carried out in our laboratory of crystal growth. Single crystals of α -LiIO₃ were grown from low-temperature aqueous solutions doped with potassium permanganate [3], L-alanine, L-lysine, L-glycine and L-valine. Based on the positive results of our previous research, this study presents the effect of doping of the amino acids L-arginine, L-nitroarginine and L-histidine on α -LiIO₃ single crystals. The crystals were grown by the method described in Hovhannesian AA et al [4]. The solution doped with L-histidine decomposed and high-quality crystals were grown from solutions doped with L-arginine and L-nitroarginine (Fig. 1).



Figure 1. Single crystals of a) pure α -LiIO₃, b) α -LiIO₃ doped with L-arginine and c) α -LiIO₃ doped with L-nitroarginine.

Thermal properties, vibrational spectra and second harmonic generation activity were assessed. Studies showed that the optical quality and physicochemical properties of the crystal are improved in the presence of amino acids. The obtained experimental data indicated that the second harmonic generation activity of the crystals of α -LiIO₃ grown with L-arginine and L-nitroarginine dopants is 1.5 times higher than that of pure α -LiIO₃.

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References

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