ABSTRACT

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The single crystals of pure and Potassium chloride, Sodium chloride and Zinc chloride doped L-Alanine Cadmium Chloride (LACC), a metallo organic nonlinear optical material is grown by slow evaporation technique. The grown crystals were confirmed by single crystal, powder XRD analyses. All the grown crystals belongs to the monoclinic system with space group C2 and the number of molecules per unit cell is $Z = 4$. Again they were subjected to various characterization techniques such as atomic absorption studies, SEM, EDAX, FTIR, UV-VIS and TG/DT analyses. The density of the grown crystals is determined using floatation method. Microhardness studies were conducted on the on the well-defined face (1 0 1) plane of the all the samples and it was found that the pure and $K^+$, $Na^+$ and $Zn^{2+}$ ions doped LACC crystals belong to the category of soft material. Second harmonic generation was confirmed by the Kurtz and Perry powder technique. The dielectric measurements were carried out for different frequencies at different temperatures. Electrical parameters such as dielectric constant, dielectric loss, AC and DC conductivities have been studied. AC and DC activation energies of all the grown crystals have been calculated.

The dielectric constant decreases due to introduction of large ionic radii $K^+$ ion and increases due to the introduction of smaller ionic radii $Zn^{3+}$ ion into the pure LACC crystal. The low dielectric constant and dielectric loss suggest that this material can be used as inter-metal dielectric material. The second harmonic efficiency and dielectric constant increases due to introduction of smaller ionic radii $Zn^{2+}$ ion into the lattice of pure LACC crystal. So that the zinc chloride doped LACC crystals are found to be potential material for nonlinear frequency conversion.