

**INVESTIGATION OF THIRD-ORDER NONLINEAR OPTICAL SEMI ORGANIC POTASSIUM BROMIDE MALATE SINGLE CRYSTALS FOR OPTOELECTRONIC APPLICATIONS**

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L-Malic acid potassium bromide MAPB, a new semi organic material was synthesized successfully by solution growth method. Single crystal x-ray diffraction analysis reveals the cell parameters of the grown crystal and it crystallized in cubic system. The molecular structure of MAPB was identified by FTIR spectral analysis. The lower cut-off wavelength ( $\lambda = 272$  nm), optical energy band gap (5049 eV) and Urbach energy (0.2381 eV) of MAPB crystal was determined by using UV-Vis-NIR spectral studies. The single electronic transitional band structure of the material was identified by photoluminescence spectrum. The various morphological formations on the grown crystal were analyzed by scanning electron microscope (SEM) study. The second order nonlinear optical properties of grown MAPB were measured by Kurtz and Perry powder technique. The thermal stability of MAPB crystal was studied by differential scanning calorimetric technique. The relative dielectric property was rigorously analyzed with various temperature ranges. Vickers micro hardness test suggest that the material belongs to soft material category. Z-scan study was employed to analyze the third order non-linear optical characteristics like refractive index ( $n_2$ ), the absorption coefficient ( $\beta$ ) and third order susceptibility ( $\chi^3$ ).

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