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Abstract

The new organic nonlinear optical material piperazinium (bis) hydrogen succinate single crystal (PPHS) was synthesized by the slow evaporation method. The solubility of PPHS was determined by gravimetric analysis and the metastable zonewidth was assessed by polythermal method. The induction period was measured by isothermal method. The experimentally calculated values of the interfacial energies are in agreement with the theoretical values. As an outcome of studying the nucleation parameters, a bulk single crystal of PPHS was grown by slow cooling method. The structure of PPHS was estimated from single crystal X-ray diffraction analysis. FT NMR spectrum was analyzed. The cut off wavelength and energy band gap values were found to be 254 nm and 4.85 eV respectively from the UV-Vis-NIR spectrum analysis. The thermal stability of the grown crystal was studied. The mechanical strength and third order nonlinear optical susceptibility of the grown crystal were measured by Vicker's microhardness test and Z-scan technique respectively.

Keywords: A1. Solvents, A1. Solubility, A1. Nucleation, A2. Single crystal growth, A1. X-ray diffraction, B3. Nonlinear optical.