The scope of this bachelor thesis is the preparation and study of new salts, which can be obtained from systems *N*-guanylglycine – inorganic acid and guanidine – amidosulfuric acid, as new materials with potential for applications in nonlinear optics. Prepared crystalline salts of *N*-guanylglycinium - i.e. chloride, two hydrogenphosphites and sulfate dihydrate along with guanidinium amidosulfate were characterized by methods of vibrational spectroscopy (infrared and Raman) and X-ray diffraction (single crystal and powder methods). To estimate the nonlinear optical properties and for the interpretation of the vibrational manifestations of *N*-guanylglycinium cation, quantum-chemical calculations were performed. Finally, for two non-centrosymmetric *N*-guanylglycinium hydrogenphosphites, the efficiency of second harmonic generation was determined for powder samples.