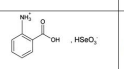
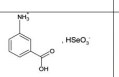
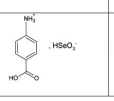
MS35-P20 | CORRELATION BETWEEN STRUCTURAL STUDIES AND THIRD ORDER NLO PROPERTIES OF THREE NEW SEMI-ORGANIC COMPOUNDS

Benali-Cherif, Rim (Abbes Laghrour Khenchela University, khenchela, DZA); Takouachet, Radhwane (Abbes Laghrour Khenchela University, Khenchela, DZA); Bendeif, El-Eulmi (Laboratoire de Cristallographie, Résonance Magnétique et Modélisations (CRM2) Université de Lorraine, Nancy, FRA); Benali-Cherif, Nourredine (Akli Mohand Oulhadj-Bouira, University, Bouira, DZA)

The study of semi-organic compounds has been of growing interest for a few years. In addition to their fundamental interest in the nature of the bonds occurring between inorganic anions and organic cations, these compounds also have remarkable physico-chemical and optical properties. Recently, the variety of semi-organic hybrid crystals has been developed for NLO applications. The combination of organic compounds, especially amino acids with mineral acids, gives rise to new hybrid crystals with strong NLO properties. Semi-organic compounds play an important role in cell metabolism; they intervene in transfer of energy because of their richness in hydrogen bonds.

Measurement of nonlinear third order electrical susceptibilities was performed for three new compounds by the THG technique. Fig. 1 shows the intensity of the THG signal as a function of the angle of incidence, it exhibits the same behavior as the silica.

Table 01. *Experimental values of nonlinear susceptibility of the third order.*

Compouds	Chemical structure	Space group	$\chi^{(3)}_{ZZZZ}$ [m^2V^{-2}] 10^{-22}
ortho ammonium benzoic acid hydrogenselenite $(o\text{-}AAB)^+, (HSeO_3)^-$		P 2_1, chiral	96,3
meta-ammonium benzoic acid hydrogenselenite $(m\text{-}AAB)^+, (HSeO_3)^-$		P $2_1/n$, achiral	67,7
para-ammonium benzoic acid hydrogenselenite $(p\text{-}AAB)^+, (HSeO_3)^-$		P -1, achiral	43,2

The values are stronger than that of silica. The largest value is observed for the first compound, = $9{,}63\times10^{-21} m^2/V^2$ due to the increase in charge transfer and the large number of hydrogen bonding which increases the dipole moment of the compound.

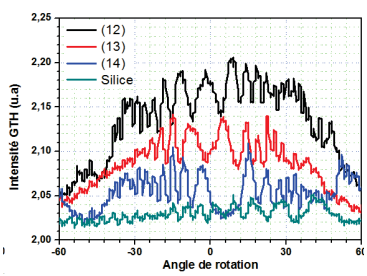


Figure 1. Intensity of the third harmonic for the three samples

These optical measurements revealed different optical behaviors of the three compounds studied. Several structural parameters affect the physical and optical properties of these materials such as: atomic arrangement, intra- and intermolecular interactions, crystal symmetry and electron density distribution.