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## Unveiling a giant molecular second harmonic generation in supramolecular compounds by a femtosecond tunable HRS technique

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The high demand for new materials with enhanced optical features has led to a growing interest in molecular nonlinear optics. This area of research has facilitated the creation of more efficient materials and a decrease in the cost of recent technologies. In particular, the macromolecules have received a special attention due to their high symmetry breaking being an excellent candidate for presenting great values of second order optical susceptibility  $\chi^2$ . (1) The polybinaphthalenes have an ideal macromolecular structure to link different chromophores to optimize the nonlinear optical responses. (2) In this context, we determined the spectral dependence of the first order molecular hyperpolarizability  $\beta(\lambda)$  of four donor-embedded polybinaphthalenes (DEP) structures in solution. For this, we apply the tunable femtosecond Hyper Rayleigh Scattering (HRS) technique. (3) The results show high  $\beta$  values for all studied macromolecules, with peak values ranging from 2500 to 16000 ( $\times 10^{-30}$  cm<sup>4</sup> statV<sup>-1</sup>). Concerning the values of  $\beta$  for pNA molecule, the (DEP) are c.a. 25 to 160 times higher at the enhancement resonance region. This giant molecular second harmonic generation makes these class of macromolecules an exceptional candidates for photonic devices, such as, in the fabrication of highly efficient organic crystals for second harmonic generation.

**Palavras-chave:** First order molecular hyperpolarizability  $\beta$ . HRS second harmonic generation. Supramolecular.

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