Synthesis and characterization of a novel nonlinear optical hyperbranched polymer containing a highly performing chromophore

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Mots-clés	hyperbranched polymer [11], nonlinear optic [12], push–pull chromophore [13]
Résumé en anglais	We report herein the peripheral functionalization of a high glass transition temperature hyperbranched polyimide with a new and highly performing electro-optic chromophore for the elaboration of a second-order nonlinear optical material. In this study, the CPO1 chromophore was selected for its very high quadratic hyperpolarizability coefficient ($\mu\beta = 31{,}000 \cdot 10{-}48$ esu at 1990 nm) and its ease of synthesis in multigram scale. As a result, the new electro-optic polymer was characterized by an r_{33} coefficient around 40 pm/V at 1.5 µm, although the poling conditions were not optimized. For sake of comparison, the electro-optic r_{33} coefficient of our previously reported similar polymer functionalized with the well-known Disperse Red One chromophore was also measured using the technique and gave a much lower r_{33} coefficient. This study underscores that hyperbranched polymers are particularly promising matrices to host highly efficient chromophore to achieve more efficient and more stable electro-optic devices than classical linear polymers.
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