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*Abstract*

# Fluorescent EDOT-functionalized poly-e-caprolactone: Synthesis, photophysical and self-assembling properties in organic solvents and its serendipitously noticed behaviour in protonated media

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In the last few years several fluorescent poly-e- caprolactones [1-3] were designed, synthesized and subsequently used as nanoparticles [1], nanofibers [2] or scaffolds [3] in various prospective bioapplications. Meanwhile, our interest was directed toward electro - and photoactive moieties - functionalized poly/or oligo-e- caprolactone, that worked as key building blocks (macromonomers) for new grafted conjugated polymers or hybrid systems successfully used as biosensors [4,5] or regenerative medicine [6]. In the same line, the present report is aimed to extend the investigations and to highlight the properties in solution (photophysical, self-assembling) of 3, 4-ethylenedioxythiophene-functionalized poly-e- caprolactone (EDOT-PCL) synthesized by ring-opening polymerization (ROP). The results of the studies in two organic solvents (chloroform and acetonitrile), having different selectivity in relation with the constitutive parts of EDOT-PCL, revealed its propensity for self-assembling, proved by Dynamic Light Scattering (DLS) measurements, while fluorescent emission maxima in the range 310-430 nm, depending on the solvent were evidenced, as well. Moreover, its capability for spontaneous oxidant-free oligomerization, presumably due to and under the action of acidic character of $CDCl_3$, serendipitously noticed during $^{13}C$-NMR registration, was subsequently validated by experiments performed in chloroform in the presence of hydrochloric acid. This is an interesting and applications-oriented useful observation which supports that recently demonstration of oxidant-free polymerization of common EDOT in the only presence of some organic acids [7] could also be extended to EDOT-containing more complex structure.

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