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Extended Abstract

Fluorescent EDOT-Functionalized Poly-ε-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-ε-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-ε-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 at extending the investigations and to highlight the properties in solution (photophysical, self-assembling) of 3, 4-ethylenedioxythiophene-functionalized poly-ε-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 a more complex structure.

Supplementary Materials: The following are available online at https://www.mdpi.com/2504-3900/69/1/13/s1.

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