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# STRUCTURAL PECULIARITIES OF THE POLYMER-DNA ASSEMBLES

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The last decade of past century was marked by a revolution in the field of materials synthesis for optical and photonic applications. It is noteworthy that major dispute regarding the origin of these materials: inorganic or organic, natural or synthetic, hybrid or pure? The goal of our work is that attempting to obtain a controlled structure and then improving the properties by adding small amounts of DNA or chromophores. The idea for using these partners is to get desired applications which regard the biophotonic / nonlinear optical (NLO) field. The used chromophores were synthesized starting from NLO sequences and contains both azo-benzenes and carbazole groups in order to induce a response to an external and/or internal stimulus. DNA is also used in NLO application but has another important property and that is targeting specific molecules/cells/tissues. This study was made to understand the perfect combination between the monomers (amides) and DNA/chromophores. The importance of this work is to highlight the best conditions and the mechanism to obtain new polymers with induced properties in order to be applied in specific fields. Moreover, we have a shot to prove the structure and properties control by reaction parameters. The molecular interaction and the surrounding media play an important role in changing of the fundamental properties of materials. So the electronically behaviors at molecular level are principally determined by the concentration of the NLO constitutive sequences. Demonstrating how such materials respond to a sensitive stimulus which affects the polar ordering is given by the solvatochromic, VCD, FT-IR and Raman studies. The physical - chemical characterization of novel compounds, proposed by us, foreshadows the potential applications of polymer materials, with such sequences, in the biophotonic and NLO field.

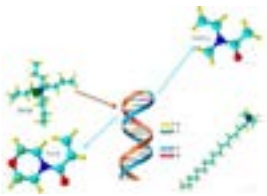

**Figure 1:** The chemical structures of the main materials used to make polymer-DNA Assembles.

**Recent Publications**

1. J B Lee, A S Shai, M J Campolongo, N Park and D Luo (2010) Three-dimensional structure and thermal stability studies of DNA nanostructures by energy transfer spectroscopy. ChemPhysChem 11: 2081-2084.
2. A Rodriguez-Pulido, A I Kondrachuk, D K Prusty, J Gao, M A Loi and A Herrmann (2013) Light-Triggered Sequence-Specific Cargo Release from DNA Block Copolymer–Lipid Vesicles. Angewandte Chemie International Edition 52:1008-1012.
3. R M Zadegan and M L Norton (2012) Structural DNA nanotechnology: from design to applications. International Journal of Molecular Sciences 13:7149-7162
4. A Czogalla, H G Franquelim and P Schwille (2016) DNA nanostructures on membranes as tools for synthetic biology. Biophysical Journal 110:1698-1704.
5. Aldea, A M Albu and I Rau (2016) New polymeric materials for photonic applications: Preliminary investigations. Optical Materials 56:90-93.

## Biography

Ana Maria Albu has her expertise in the field of Polymer Science and related fields such as: organic synthesis, smart materials, design and manufacture of the new architecture materials with peculiar applications like optic, opto-electronic, micro-electronics, photonic; biomaterials. Two main directions are distinguished: particular aspects in macromolecular synthesis and synthesis of polymeric materials with non-conventional applications. For her, the research activity is closely related to didactic activity, her being devoted teacher to training and orientation of students to specialized technical domains. It is a recognized presence in the field's conferences through the interdisciplinary approach of its research. In recent years, she has focused her activity to the synthesis and characterization of polymer materials with applicability in the biophotonic field. At the same time, by interdisciplinary approaches, it is looking for solution for novel, eco-friendly polymer materials with applications in the field of fuel cells, selective recovery of metallic ions, specialized coating.

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