

New core-shell nanocomposites - synthesis, characterization, and fluorescence properties

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Core-shell nanostructures described in this work can be specially designed for fluorescence application e.g. for excitation energy transfer studies [1]. They are made of two or more materials, with the inner material acting as the core and the outer material acting as the shell. The role of the core is most often played by metallic nanoparticles such as Ag or Au, while the shell may be inorganic metal oxides or organic polymers coats. [2]. In this work, we present the synthesis and characterization of new Au@SiO₂ nanocomposites as a base for modification by strongly fluorescent compounds to use as a part of probes in the fields of bioassays and bioimaging shortly.

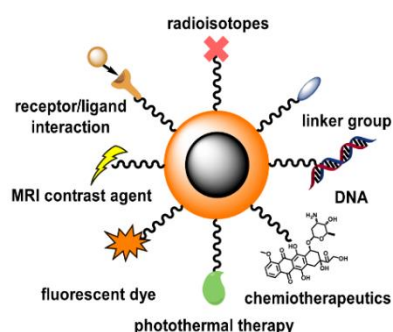


Figure 1. Examples of possibilities for modifying core-shell nanostructures [1].

This material was prepared by the sol-gel method and was characterized by TEM microscopy, UV-Vis, and infrared spectroscopy (IR). Moreover, we conducted the angle measurements due to the strong relationship between the level of surface wettability and cell adhesion efficiency. In addition, the main characteristics of luminescence provide information on their behavior in new environments.

[1] Synak A.; Adamska E.; Kułak, L.; Grobelna, B.; Niedziałkowski P., and Bojarski P. New core-shell nanostructures for FRET studies: synthesis, characterization, and quantitative analysis, *International Journal of Molecular Sciences* 23 (2022) 1-13

[2] Kowalska, A.; Adamska, E.; Grobelna, B. "Medical Applications of Silver and Gold Nanoparticles and Core-shell Nanostructures Based on Silver or Gold Core: Recent Progress and Innovations" (2024) *ChemMedChem* e202300672.

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