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Supramolecular theranostics goes green

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Abstract

Unsustainable life, production and consumption styles focusing on quantity and often overlooking other goals have brought environment and public health to the breaking point of today and caused many different diseases to appear while increasing incidence and prevalence of all diseases among which cancer is of major concern. World Health Organization projected the number of deaths due to cancer alone to be ~13.1 million by 2030. To a certain extent conventional chemotherapy has been successful, but poor bioavailability, high-dose requirements, adverse side effects, low therapeutic indices, development of multiple drug resistance, and non-specific targeting have been severe limitations to its success.

These limitations can be overcome via "theranostics" as it is precision medicine providing simultaneous diagnosis, targeted treatment and monitoring. Here the major actor is the drug – the therapeutic compound. Conventional applications suffer from limited effectiveness, poor bio distribution, and lack of selectivity, but developing new drug molecule is expensive and time consuming. Therefore, for to improve the safety efficacy ratio of "old" drugs by individualizing drug therapy, dose titration, and therapeutic drug monitoring nanotechnology and green chemistry provided the required formulations, which have optimal pharmacokinetic properties for in vivo applications, since their Nano size allowed them to be subject to tissue extravasations and renal clearance whereas their counterparts are quickly opsonized and removed from the bloodstream via the macrophages. Therefore, it is of great need and importance to develop new green chemistries and technologies to produce supramolecular Nano medicines by employing appropriate inorganic and organic structures as theranostic platforms.

This talk will be about development and production of smart theranostic systems with high biocompatibility, loading efficiency, circulation stability, predetermined release kinetics, targeting and monitoring of anti-tumor agents via a new green production technique: electrohydrodynamic atomization modified by pressurized green solvents. A new light switchable/controllable delivery system composed of mesoporous composite materials such as MMoO4: Eu- MCM-41-Fe2O3 capable of magnetic and luminescent properties and controlled drug release will be introduced.

Biography

Esra Demirdogen, Ass. Prof. Dr., has her expertise in green chemistry and nanotechnology especially on smart materials and drug delivery systems and recently developed SCF-EHDA for production of new supramolecular theranostic platforms for which she received many awards. She pioneered green chemistry and sustainable technologies initiation in Turkey and established green chemistry centers both at home and abroad. She authored more than 100 papers, 4 books and coordinated and completed many national and international projects and lectured in many different countries. She is editorial board member and reviewer of many distinguished scientific journal. She organized, chaired and served as organizing and scientific committee member in many national and international scientific meetings. She received several research and technology awards (TR Technology Development Foundation, TR Analytical Chemistry, Turkish Chemical Society, Higher Education Commission of Turkey, B&H and Pakistan). She is the chairperson of Analytical Chemistry at Karatekin University, Turkey.

Publications

1. The photoluminescence and thermoluminescence characteristics of the Eu3+ doped CaMoO4: Detailed kinetic analysis of TL glow curves
2. The effect of surface charge on cellular uptake and inflammatory behavior of carbon dots
3. The effect of Dy3+ doping on the thermoluminescence properties of Ba2SiO4
4. Novel antibacterial cellulose acetate fibers modified with 2-fluoropyridine complexes
5. SUPRAMOLECULARTHERANOSTIC PLATFORMS GOES GREEN
6. Novel pyridine-derived platinum complexes: Synthesis, characterization, cytotoxic and thermal properties and detailed kinetic analyses
7. 2-Chlorobenzoylthiourea-modified MCM-41 for Drug Delivery
8. LDH- ɣ-Fe2O3-MoS2 composite for Vegetable Oil and Pb2+ Removal From Water

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