Journal of Chemistry

Special Issue on

Spectroscopic Methods to Detect the Interaction of Nanomaterials in Environment

CALL FOR PAPERS

The synthesis, characterization, and application of nanomaterials (NMs) have become thriving and prosperous research topics in the last two decades. The excellent optical and physical properties of nanomaterials allow for a broad range of applications, such as in electrical products, medical treatment, agriculture fields, personal care, cosmetics, among others. However, the massive increases in the production and applications of nanomaterials in recent years have led to a great quantity being released into the air, water, and as biosolids, as a result entering and moving through the food chain and affecting living organisms, such as plants, animals, insects, and even human beings.

By using spectroscopic methods, such as inductively coupled plasma-optical emission spectroscopy or mass spectroscopy (ICP-OES/MS), Fourier-transform infrared spectroscopy (FTIR), and ultraviolet-visible spectrophotometry (UV-vis), research has discovered that NMs have the capability to translocate in an organism's cells, altering a series of chemical and biological activities. Due to the innumerable applications of nano-enabled products in everyday life, they have a variety of compositions, sizes, crystal forms, and surface properties, all of which introduce different influences into environment and have different biological effects. Because of the limitations from instruments themselves, it is necessary for researchers to combine several spectroscopic methods, and even explore novel spectroscopic platforms in order to investigate the interactions of these various NMs in both the environment and in living organisms. For example, ICP-OES/MS is the most widely used instrument because of its high sensitivity and accuracy; however, it requires the tedious preparations of samples. In contrast, it is easy to prepare samples for FT-IR; however, it is limited by its inability to give quantitative results. UV-vis can achieve quantitative *and* qualitative analysis, but it has difficulty in providing accurate and real-time data.

Moreover, the effects and mechanisms by which nanomaterials disrupt the (primary and secondary) accumulation of metabolites, photosynthesis (pigments and gas exchange), nitrogen fixation, DNA expression, and water transpiration in living organisms are still largely unknown. Overall, further studies and more efficient investigation platforms are required to understand even the basics of the mechanisms of action of NMs in biological systems and thereby propose and develop solutions to avoid the risks of NMs and make them more beneficial to the environment and human beings. The special issue will welcome both research papers and review articles of high significance that meet the scope and requirements for publication in *Journal of Chemistry*.

Potential topics include but are not limited to the following:

- The translocation of nanomaterials
- Novel findings about the physiological/biochemical impacts of nanomaterials
- Novel spectroscopic methods, including the combinations of techniques, to detect the interaction of nanomaterials in the environment
- Effects of less studied nanomaterials (composition, size, crystal form, and surface formulation) on biological systems
- Mechanisms of action of nanomaterials in biological systems

The application of spectroscopic techniques to detect and identify nanomaterials in the environment and monitor their accumulation in living organisms

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/jchem/materials.chemistry/smdinp/.

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