Nanosensors: Carbon Based Nanostructured Materials for Sensitive Monitoring of Pharmaceuticals

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A sensor is a device that detects and responds to some type of input from the physical environment. The sensor can convert the measurement into a readable signal. For electroanalytical sensor technologies, nanomaterials are mostly used for creating a biosensor, biomarker, or nanosensor. In recent years, sensor technology with its wide applications has become very popular in the biomedical and pharmaceutical areas. Sensor studies provide an overview of some of the important and recent developments brought about by the application of carbon-based nanostructures to nanotechnology for both chemical and biological sensor development and their application in pharmaceutical and biomedical areas. Nanotechnology has become very popular in the sensor fields. It is thought that the utilization of such technologies, as well as the use of nanosized materials, could well have beneficial effects on the performance of sensors. All materials are composed of grains, which in turn are made of molecules and atoms. Nanomaterials are those having grain sizes in the range of nanometers. Nano-sized materials have been shown to have a number of novel and interesting physical and chemical properties. There exist various materials of different types for fabricating nanosensors. Especially, functional carbon-based nanomaterials have become important due to their unique combinations of chemical and physical properties, extensive research efforts are being made to utilize these materials for various industrial applications, such as high-strength materials and electronics. These advantageous properties of carbon-based nanomaterials are also actively investigated in several areas of biomedical and drug assay. Electrochemical nanosensors have recently found extensive applications in pharmaceutical and biomedical industries with some advantages such as lower detection limits, wider linear response range, sensitivity, good stability, and reproducibility when compared with other sensors and techniques. Nowadays, a lot of different analytical methods are used in environmental, pharmaceutical, or clinical laboratories, and also a number of commercial point-of-care devices work using nanosensors. As the demand for smaller, faster, cheaper, and ultrasensitive qualification and quantification of samples rapidly increases, these methods provide a viable path toward the next generation of electrochemical sensors. In recent years, carbon-based nanosensors have been commonly used in pharmaceutical applications, further for real sample applications like dosage forms, human body fluids, etc.

References

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