NANOTOXIC MATERIAL SENSING METHOD USING DNA IMMOBILIZED QCM

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Abstract- For the several decades, various nanomaterials are broadly used in industrial fields, research areas and commercialized products. Among many nanomaterials, silver ion, carbon nanotube, zno, and mercury ion etc are of the widely used nanomaterial in real life. However, high toxicity of those materials has been reported and the detection method is required for human health and environment. In present study, high-sensitive, label-free detection methods of nanotoxic materials are described. We have developed a sensitive and selective dna immobilized quart crystal microbalance (qcm) based sensor for detection of nanotoxic materials by using resonance frequency shift. In this study, we propose the sensitive in situ detection of nanotoxic materials by using qcm functionalized with a specific dna for a target material. It also allows the detection of target material rapidly in real time. In contrast to the conventional methods, this method is label-free and sensitive, capable of direct rapid detection and real-time monitoring. The results suggest that qcm-based detection opens a new avenue for the development of a practical water-testing sensor.

ABSTRACT

For the several decades, various nanomaterials are broadly used in industrial fields, research areas and commercialized products. Among many nanomaterials, silver ion, carbon nanotube, ZnO, and mercury ion etc are of the widely used nanomaterial in real life. However, high toxicity of those materials has been reported and the detection method is required for human health and environment. In present study, high-sensitive, label-free detection methods of nanotoxic materials are described. We have developed a sensitive and selective quart crystal microbalance (QCM) based sensor for detection of nanotoxic materials by using frequency shift. In this study, we propose the sensitive in situ detection of nanotoxic materials by using QCM functionalized with a specific DNA for a target material. It also allows the detection of target material rapidly in real time. In contrast to the conventional methods, this method is label-free and sensitive, capable of direct rapid detection and real-time monitoring. The results suggest that QCM-based detection opens a new avenue for the development of a practical water-testing sensor.