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How to commercialize a survivor of Covid-19? "A Nano-Tech Sensitive Surface Plasmon Resonance Sensor for virus detection"

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Abstract

The commercialization of newly developed products is often the main concern of all innovative companies. Business school libraries are full of case studies about the failure of products that were introduced to the market by high excitement while could not get the market response and simply discontinues (i.e., 3D TVs). Generally, studies show that more than 70% of products that are launched to the market may fail due to the lack of market interest or simply because the product cannot perform as promised by the company.

This process will be even more complicated the time that company plans to launch the newly developed to industry-based market. Companies often purchase if the product/service can either reduce their cost of operations or improve their customer experience without considering the emotional appeals of the product that usually happens in the consumer market. As a result, conducting pre-launching market research to gauge the market sentiment and its readiness is even more important than the common consumer-based products.

Surface plasmon resonance is a versatile technique to recognize biomolecules such as glucose [1, 2, 3,], DNA, mRNA, virus, and protein. The surface plasmon resonance (SPR) depends on the conductivity of the thin layer and it is an optical-electrical phenomenon that occurs at the interface of metal and dielectric thin layers. The gold and silver layers are the best candidates to use for the generation of SP-wave in the SPR sensor. The metal layer should be modified using polymer and nanostructure composite to improve the sensitivity and selectivity. Recently, the free label biosensor chip is an interesting subject in biotechnology and biology. Therefore, the carbon nanostructures (graphene, graphene quantum dots, and carbon quantum dots) have a high potential to interact with the protein, virus [4, 5], carbohydrates, and saccharide-based components. Hence, in this study, the application of graphene and carbon quantum dots was presented to detect glucose and uric acid. The SPR sensor chip was modified using polypyrrole graphene and polypyrrole carbon quantum dots. The SPR sensor was based on prism coupling and the polymer nanocomposite was coated on the surface of the gold layer with the electrodeposition methods. The limit of detection was less than 1 ppm and the response time was about 400 s.

Biography 1:
Hossein was born in Iran (1964). He achieved be selected as Pilot Cadet (1985); Bachelor Degree in English Translation (1992); Master Degree in International Marketing (2000) and Ph.D. in Business Management (2004). He interred in the world of Management and Business as General Manager in one of the pioneer continuous paper manufacturing companies (1991). He has promoted his international academic career by joining with University Putra Malaysia (2009). He honoured different awards and honours such as Distinguished Research Award- USA

(2010), Excellent Service Award- UPM (2011), Honoured Professorship- IIC (2014) and Residence Pass Talent-Malaysia (2015). Hossein has more than 150 academic publications. He is currently collaborating with the Case Writers' Association of Malaysia as Executive Committee Member (2011), Malaysian Association of Business and Management Scholars as Board of directors (2020). Hossein is serving as an Associate Professor at Sunway University in the area of Marketing Management.

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Biography 2:

Amir Reza has his expertise in optical biosensor particularly plasmonic sensor based on carbon nanostructure and laser ablation technique. He achieved his PhD in Applied Optics and he achieved the senior postdoc certificated in nanophotonic. He improved, fabricated and synthesized the plasmonic methods, polymer composite and carbon nanostructure. He used the plasmonic sensor and carbon nanostructures for detection of toxic chemical and biomolecules that are harmful to the body and environment. At this moment, he is invited researcher in the Shahid Beheshti University.

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