

Nanomaterials for Self-powered Biosensors

Keywords: heterostructure, photoelectrochemical and visible light



National Institute for Materials Science

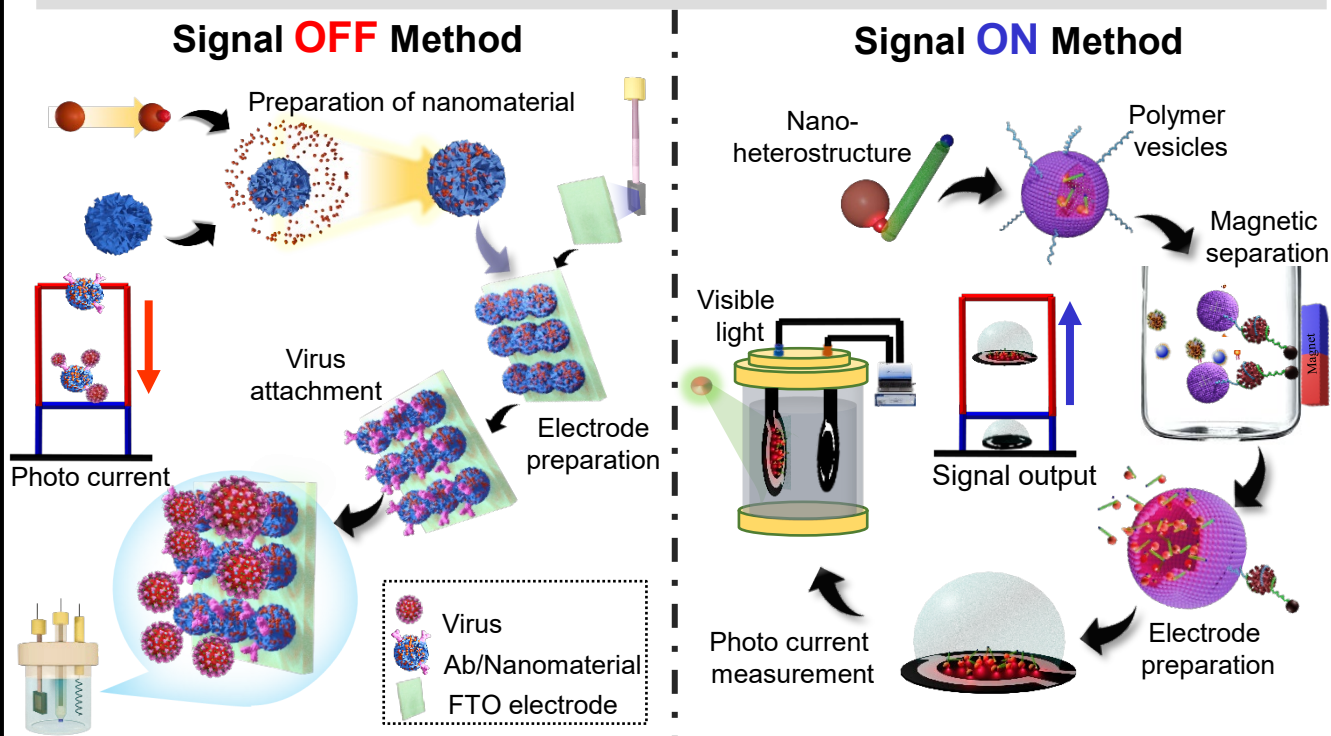
Background

The outbreak of COVID-19 and its continued spread have seriously threatened public health. In the absence of therapeutic agents, the detection of viruses in early stage of infection is the only way to control the pandemics. It requires the development of a biosensor that would ideally produce a quantitative signal for individual viral particles.

Aim

This research aims to develop a self-powered photoelectrochemical (PEC) virus detection device. The generation, separation, and interfacial-redox-reaction of the photoinduced carriers are very important for efficient PEC detection. Controlling the sluggish interfacial reactions by nano-heterostructures will lead to construction of advanced PEC platforms.

Advanced Research Topics



Publications

- Ganganboina et. al. Biosens. Bioelectron., 185, 113261, 2021.
- Ganganboina et. al. ACS Appl. Mater. Interfaces, 12, 45, 50212–50221, 2020.
- Ganganboina et. al. Biosens. Bioelectron., 170, 112680, 2020.

Summary

- The detection signal is majorly based on the photo current response generated by novel electrocatalyst upon excitation with visible light
- The architecture of multicomponent nano-heterostructure allows to adjust the position regulating the hole and electron recombination

Research outcome

- The success of the whole project can make a self-powered visible-light-driven device for rapid and highly sensitive virus detection which can meet the emerging need for point of care diagnosis.



Akhilesh Babu Ganganboina, International Center for Young Scientists

E-mail : GANGANBOINA.akhileshbabu@nims.go.jp

URL : www.researchgate.net/profile/Akhilesh-Ganganboina/research