An Electrochemical Sensor Based on a Generator-collector Configuration for Rapid Single Particle Detection

ID# 2022-5409

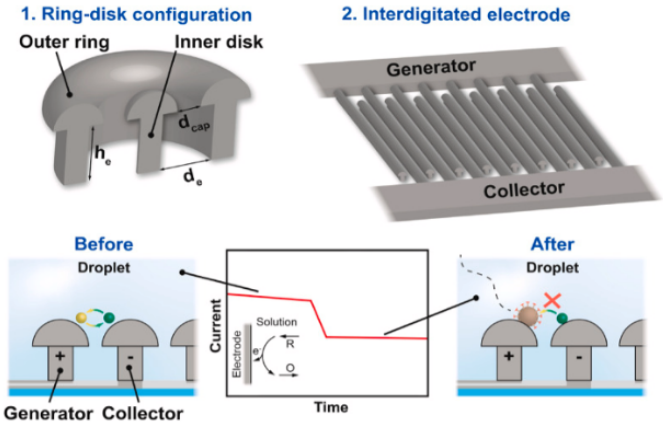

Figure 1: Ring-disk configuration and generator and collector layout

Technology Summary

The COVID-19 pandemic has highlighted the need for rapid, low-cost, and sensitive virus detection platforms to monitor and mitigate widespread outbreaks. The proposed design combines a redox-cycling amplified electrochemical current with electrophoresis-driven electrode-particle collision for rapid virus detection. The effects of experimental and geometric factors were studied to optimize the sensor design. As a result, the ring-disk configuration was found to reduce single virus capture times from 700s to approximately 20s. The proposed invention, for that reason, offers rapid virus detection.

Application & Market Utility

The proposed invention is a virus detection platform with increased efficiency and lower production cost. Compared to the original configuration, the detection platform increased its sensitivity drastically, making it a viable option for various viruses while reducing the production cost. As a result, the invention has the capability of mitigating widespread outbreaks. Currently, the market for virology testing is estimated to value at approximately $12.5 billion dollars. The market for virology testing is suspected to grow in the future with the market reaching approximately $14 billion dollars.

Next Steps

Researchers are further optimizing and refining their technology and are currently looking for licensing partners to bring the full potential of this innovation to the world.

TECHNOLOGY READINESS LEVEL 4

Seeking

Investment | Licensing | Research

Keywords

- Electrochemical sensor
- Single particle
- Redox cycling

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