Research Initiative for Supra-Materials

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Zoomハイブリッドにて実施

Carbon Nanotube Array For Rapid Virus Enrichment And Sample Preparation

Dr. Yin-Ting Yeh

Assistant Research Professor @ the Pennsylvania State University, USA
Research Associate @ the National Institute of Standards (NIST), USA

Abstract:

Viruses evolve rapidly and unpredictably, challenging the effectiveness of disease diagnostics. To help control outbreaks and understand their origins, the first step is often isolating viruses from infected samples for characterization. We demonstrate that multiple virus strains can be simultaneously enriched and optically detected in only a few minutes without using any labels. We grow carbon nanotube forests on various substrates to capture different viruses based on their physical sizes. A portable platform that captures viruses by their size, coupled with Raman spectroscopy, resulted in successful virus identification with 90% accuracy in real-time directly from clinical samples. Furthermore, this viable enrichment process enables culturing of the captured virus, and characterization by electron microscopy and deep sequencing. This platform is an effective system for virus surveillance by enabling real-time virus identification and can be modified for virus detection from different sample types.

Bio:

Yin-Ting Yeh is a research associate at the National Institute of Standards and an assistant research professor at the Pennsylvania State University. He earned his Ph.D. in the Department of Biomedical Engineering at Penn State in August 2015. He then did his postdoc training in the Department of Physics at Penn State, under the supervision of Prof. Mauricio Terrones. Currently, he is a visiting scientist in Dr. Elodie Ghedin's research group at the National Institutes of Health (NIH) to develop enrichment platforms for infectious diseases.