

Magnetic bead-based “sample-to-answer” system for waterborne pathogen detection and enumeration

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Continuous surveillance of drinking water is important to provide early warning of contamination and ensure continuous supplies of healthy drinking water. Isolation and detection of a particular type of pathogen with low concentration diluted in a large water sample and removing associated inhibitors from the concentrated sample present the most important challenges to water quality monitoring laboratories. Despite the advancements in pathogen identification, current diagnostic methods have limitations including laborious sample preparation, bulky instrumentation, and slow data readout. Additionally, field-deployable or “point-of-interest” systems are urgently needed in order to facilitate detection of pathogens even in remote area before spreading these pathogens through the public water systems. Functionalized magnetic particles play significant roles in both the sample preparation and detection processes. The great advances in magnetic particles synthesis, coating, high spatial resolution manipulation accompanied with immune-based or molecular based techniques and advance optics coupled with microfluidic technology offer a great opportunity to realize an integrated system of pathogen detection. This talk highlights our research towards the development of a magneto-fluidic integrated detection system for waterborne pathogen detection, emphasizing the role of functionalized magnetic particles as the gold standard tool in sample preparation and detection processes.

Biography

Qasem Ramadan received his PhD in Bio-Microelectromechanical systems at Nanyang Technical University in 2006. From 2004 to 2008 he was a senior research engineer at the A-Star institute of microelectronics/Singapore. Since 2008, he is a research scientist at the Swiss Federal institute of Technology (Lausanne)

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