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## Novel rotational valve controlled paper-based microfluidic chip and its application in environmental and biochemical analysis

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We integrated the moving valve on a paper chip and the control of the fluid is realized by the connection and disconnection between the movable channels through the rotational valves. This method can be used to analyze a variety of environmental pollutants and tumor markers, demonstrating that the platform has good applications for environmental detection and bioanalysis in environmental pollutants. We proposed a new strategy for manipulating capillary driven fluids through a real-time controllable moving valve. The use of movable valves allows control of the movement of the paper path between the different layers, enabling the connection or disconnection of the channels. This fabrication process is very simple, versatile, and can be used on microfluidic paper chips of varying complexity levels. We combined ELISA (enzyme linked immunosorbent assays) with mobile valve paper chip to construct a microfluidic-based colorimetric immunosensor. Relying on the intensity of the color-developing signal, we quantitatively analyzed the concentration of carcinoembryonic antigen (CEA) and achieved good results. 2. Using this new rotational chip platform, we have developed a new type of three-dimensional rotating microfluidic chip that uses fluorescent quantum dots as a substrate and combines the specific recognition effect of molecularly imprinted materials to simultaneously treat two phenolic contaminants (4-NP and TNP) for quasi-deterministic quantitative analysis. The microfluidic paper chip adopts a multi-layer integrated chip structure, and the rotating design increases the detection channel, forming a high-throughput detection, effectively utilizing space, low cost, flexible use, and convenient to the detection process.

### Biography

Bowe Li is an Associate Professor at the Yantai Coastal Zone Research Institute of the Chinese Academy of Sciences. He graduated from the Dalian Institute of Chemical Physics of the Chinese Academy of Sciences in 2009 with a PhD in Analytical Chemistry. He was funded by NIH program for Postdoctoral Research the at Florida State University. He has been engaged in microfluidic chip laboratory research for many years, including basic research in chemistry and biology based on microfluidic chip platform and its applications in environmental monitoring, POCT, food safety, etc. other fields. He has published more than 30 SCI papers.

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