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A Study of Capacitively Coupled Contactless Conductivity Detection (C^4D) Electrode Configurations on Signal Detection Sensitivity

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Capacitively Coupled Contactless Conductivity Detection (C^4D) technique has been widely used in detecting particles of interest in microfluidics applications. In this technique, change of solution conductivity is detected when particles in solution flow pass electrodes. Detection sensitivity depends on electrodes and microfluidic channel configuration. Influenced electrode geometries include electrode dimensions, detection area, and thickness of the wall separating electrodes and the channel. Various sizes and shapes of C^4D electrodes fabricated using printed circuit board patterning technique and arrangements between electrodes and channel were used in determining detection sensitivity when particular particles in solution pass through. The sizes of the electrodes fabricated for this study were 50, 90, and 150 microns. The C^4D electrodes were tested with the various oil droplet sizes in water. It was found that the electrodes could be used to detect the oil droplets of size down to about 100 microns.

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