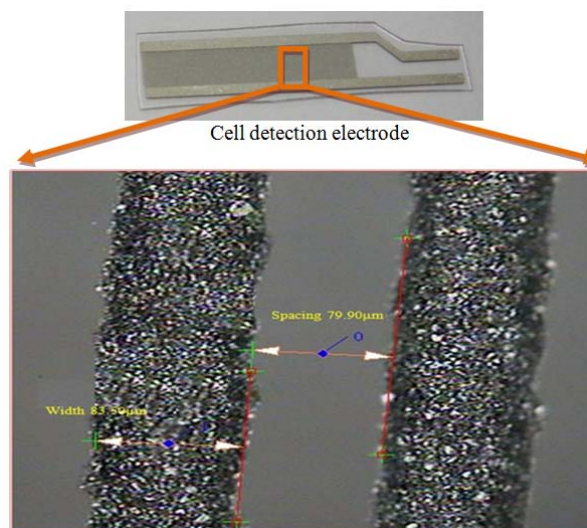


Screen-printed electrode design for cell behaviors detection by electrical cell-substrate impedance sensing

Ying-Jui Lin, J.Z. Tsai, J.T. Liu, C.J. Chen, S.J. Chang and M.W. Lee

National Central University, Taiwan

Electrical cell-substrate impedance sensing (ECIS) technique can be used to detect cell behaviors, such as cell adhesion, cell growth, cell apoptosis and cell metabolism, on a substrate with electrodes. In this study, aiming to monitor cell behaviors in real time, we developed screen-printed interdigitated electrodes with electrode widths and spacings commensurate with cell sizes. In general, screen printing technique provides advantages in fabricating costs, convenience in design and thick film characteristic. However, the difficulty in miniaturizing the electrode feature size has limited the adoption of screen printing in some applications. By using appropriate steel plate and silver ink in screen printing fabrication, we have succeeded in scaling down the electrode width and spacing to sub 100 μm . In this study, electrodes with different spacings and widths were designed to evaluate their sensitivity of detecting cell adhesion. Our experiment results showed that reducing the electrode dimension can increase the cell adhesion sensitivity, supposedly because of more concentrated electric field distribution surfacing the substrate and electrodes. Finally, the optimized electrode width and spacing for cell detection were decided and ECIS measurements were conducted. This interdigitated electrode design could be applied in cell biology researches in the future.



Biography

Y.J. Lin is a MS student of Electrical Engineering in National Central University, Jung-Li City, Taiwan. He received the BS degree in electrical engineering from Chang Gung University, Taoyuan City, Taiwan. His current research interests include biomedical signal processing, biosensor, micro-processor and C and Matlab programming.

itoldyouso10@gmail.com