

Aluminium interdigitated electrode with 5.0 μm gap for electrolytic scooting

ABSTRACT

The goal of the research project is to design, fabricate, and characterize an extremely sensitive biosensor for use in healthcare. Using AutoCAD software, a novel IDE pattern with a 5 μm finger gap was created. Conventional photolithography and regular CMOS technology were used in the fabrication process. A 3D nano profiler, scanning electron microscopy (SEM), high-power microscopy (HPM), and low-power microscopy (LPM) were used to physically characterize the manufactured IDE. Chemical testing was done using several pH buffer solutions, and electrical validation was performed using I-V measurements. The Al IDE was produced, with a tolerance of 0.1 μm between the fabricated IDEs and the design mask. Electrical measurements verified the flawless fabrication of the IDE, and the device's repeatability was validated by the outcomes of comparable IDE samples. For each pH buffer solution, a modest additional volume of 2 μl was used to quantitatively detect slight current fluctuations in the microampere range. Through pH calibration for advanced applications in the realm of chemical sensors using an amperometric method, this research study has verified the chemical behavior of the IDE.