Photolithographic processes for achievement miniature piezoelectric devices IDT

SAFOU Abdelkader, BADIDI BOUDA Ali, ZERDALI Mokhtar, HAMZAOUI Saad

Abstract : This paper deals transducer with the technology of piezoelectric IDTs (Interdigital transducers) by photolithographic technique, especially SAW (Surface Acoustic Waves) sensors. We conducted synthesis of thin layers of zinc oxide doped copper on glass substrates Corning glass, using Radio Frequency RF technology, then we elaborate interdigitated fingers IDT miniatures on glass substrates, silicon and quartz. Finally, a microlocation of ZnO piezoelectric on the IDT.We proceeded to the achievement of interdigitated fingers IDT, through microlithography technical, and deposition of layers of ZnO:Cu on IDT by sputtering RF technical. For this, we developed the insulation technique by projection mode optics. The main purpose of this technique is the miniaturization of devices IDT. Characterization techniques were implemented for characterizing of ZnO layers, such as the X-ray diffraction, the scanning electron microscopy MEB and optical microscopy for IDT devices. The minimum reduction is obtained of 1/ 30; this has yielded IDT for width and spacing of 5 microns. This technique has also improved the miniaturization factor an order of 30.

Keywords : SAW sensor, fingers interdigitated IDT, Photolithography, Piezoelectricity, RF sputtering