

Probing the Ph measurement of self-aligned polysilicon nanogap capacitor

Abstract

With their bright potential in effective sensing, nanogap capacitor show promise as a device to measure wider aspect of dielectric properties. In this paper, we demonstrate the effectiveness of nanogap capacitor in detecting the changes of pH measurement via Dielectric analyzer (C-V and C-F characterization) as its stables under each reading and repeatability. The purpose of this paper is to report on the fabrication and electrical characterization of nanogap device. We introduce the conventional lithographic combined with the size expansion technique for the transition from micro (3.13 μm) to nano-sized (42nm) gap. The evolution of gaps nanogap pattern expansions were verified by using SEM by controlling the dry oxidation time of device. Then, Ti/Au layer were deposited onto the final device for probing purpose. Different level of pH (3, 5, and 10) has been tested and conformed by repeating each test. About 10 μm of pH liquid were dropped using pipette in the middle of gap probing (2-wire measurements) is done on the Au pad fabricated on the nanogap device. 10 μm of pH liquid were dropped using pipette onto the target and the reading will be taken. Probing is done via dielectric analyzer on the couple of gold pad apart of the capacitive nanogap biosensor to investigate the effect of excitation frequency and voltage on capacitance sampling.