

Abstract :

In this paper, we have modeled the results of negative bias temperature instability (NBTI) degradation obtained by using charge pumping and linear drain current techniques in the same time measurement setup. The proposed model is based on Hydrogen molecule ( $H_2$ ) cracking at trapped hole center (E'center) to explain the decrease of oxide trapped charge at long NBTI stress time ( $t > 1000s$ ). In fact, according to experimental data, which are obtained in the framework of the above cited setup, NBTI induces oxide trap generation at earlier stress time followed later by a decrease (annealing) at long stress time. This behavior looks like annealing in radiation effect on gate oxide in MOSFET, which is explained by  $H_2$  cracking model. Based on this similarity, we extended this model to NBTI effect. The extended model presents a perfect correlation with the experimental data