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Carrier recombination dynamics in silicon-dioxide layer on silicon by scanning capacitance microscopy

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It was known that SCM can measure the two dimensional dopant profile in a semiconductor with a nanometer resolution. We measured a 3D carrier density profile by varying the applied bias, i.e. changing the depletion width. The measured 3D profiles show a good agreement with simulated ones. We have found that not only carrier density profile but also isolated traps can be measured by this method. Hole and electron traps by electrical stress and the recombination of trapped charge with majority carriers in semiconductor were observed. The recombination time is functions of the trap level, location, the quality of oxide layer. The dynamics will be presented in real time in this talk.