

[22-S10]

The transient Si surface sputtering under low energy oxygen bombardment studied by *in-situ* MEIS

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For accurate shallow junction SIMS depth profiling, the transient sputtering effect in the pre-equilibrium region should be clearly understood. The transient sputtering yield change of an amorphous Si layer on a Si(100) was measured quantitatively as a function of the ion dose for normal incident 500 eV O_2^+ ion bombardment with *in-situ* medium energy ion scattering spectroscopy (MEIS). As shown in Fig. 1, at the initial stage of 500 eV O_2^+ ion bombardment before the surface oxidation, the sputtering yield of Si was 1.4 (Si atoms/ O_2^+). With sputtering, the Si sputtering yield decreased rapidly down to 0.06 (Si atoms/ O_2^+) at the ion dose of $3 \times 10^{16} O_2^+ \text{ cm}^{-2}$. An initial Si surface swelling was observed due to the higher oxygen incorporation rate than the Si sputtering rate.

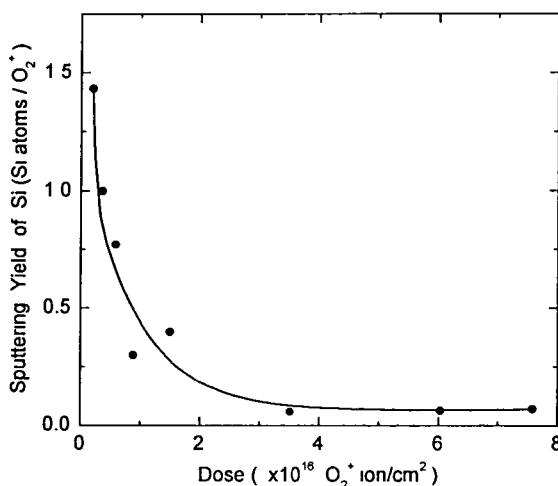


Fig 1. The sputtering yield of Si as a function of O_2^+ ion dose.