

International RRT of MEIS analysis of HfO₂ thin films and multiple delta layers

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Scattering cross sections, electronic stopping power, and straggling are important parameters in MEIS analysis. Most of the equations to calculate these parameters in MEIS analysis can be considered to be extended from high energy scattering, even though these parameters in MEIS analysis were tested for certain cases. Recently, with development of MEIS system instrumentation, wider ranges of ion beam energy, ion species, and ion analyzer were used. We tried to see the consistency of MEIS analysis results and to find out the most accurate MEIS parameters for various MEIS analysis conditions.

2015, the 1st RRT were performed with 1, 3, 5, 7 nm HfO₂ thin films. To our surprise, quite large scattered values of HfO₂ thickness or the amount of Hf as large as 20~30% were observed. Couple of possible causes were suggested and discussed. We decided to run 2nd RRT with a slightly modified sample structure and additional multiple HfO₂ delta layers for a more accurate estimation of MEIS parameters, which is in progress.

In this presentation, we will report all the RRT results of MEIS spectra from participants and the corresponding data analysis using the PowerMeis software. The 1st RRT and 2nd RRT will be used to find out any source of errors in MEIS analysis and the most accurate MEIS analysis parameters over the MEIS analysis conditions via active discussions from participants and HRDP attendants.

The results will be reported to ISO/TC201/SC4 Depth Profiling probably to develop a standard in MEIS analysis.