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Multiple Internal Reflection Fourier-Transform Infrared Spectroscopy and Its Application to ALD Mechanism Studies

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Multiple internal reflection (MIR) Fourier-transform infrared (FTIR) spectroscopy has been fitted with an ultrahigh vacuum (UHV) system to study adsorption and/or surface reactions that occur in atomic layer deposition (ALD) processes. In this presentation, the building up of a UHV system that is compatible with a commercial FTIR spectrometer will be shown. Also, a preliminary result of its application to the study of the initial mechanism for the ALD of aluminum oxide (Al_2O_3) will be explained where dimethylaluminum isoproxide, $(CH_3)_2AlOCH(CH_3)_2$, and water were used as sources for aluminum and oxygen, respectively. The technique will be useful for analyzing surface reactions between different organic molecules.