

Oxygen Atom Recombination on Si and SiO₂ surfaces

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As device size is smaller, the atom behavior is more important key parameter on surface and interface. Atomic scale analysis is needed for the control of this key parameter. Atom recombination which is the basic theory of atom behavior, applies to surfaces modification, thin film deposition, dry cleaning and the development of the thermal protection tiles of space shuttle. For the measurement of atom recombination coefficient on silicon and silica surfaces, dissociated oxygen atoms using rf-plasma, were allowed to diffuse through the reactor and to be recombined to form molecules. In-situ, we investigated the changes of chemical composition using XPS and surface topology using AFM/STM. This study showed that oxygen atom recombination is dependent on temperature and oxygen atom recombination on silicon surface is higher than on silica surface and recombined oxygen atoms don't desorb to the silicon and silica surfaces at the low temperature(300K).