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Formation of nanoscale SiN_x islands by using the ionized N₂ gas on the silicon substrate of different surface orientation

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We formed the nanoscale SiN_x islands by exposing the ionized N₂ gas on the silicon substrates at room temperature. The nitridation process was performed on Si(001) and Si(111) surfaces during various exposure time. The atomic force microscopy experiments showed that the sizes of the SiN_x islands were 15 ~ 20 nm and 3 nm in height. We investigated the shift of the Si 2p and N 1s core-level peaks in the in-situ x-ray photoelectron spectroscopy measurement in order to confirm the chemical composition of the islands. In this talk, we will discuss dependence of the nanoscale SiN_x island formation on the surface orientation of the substrate and the exposure time of the ionized N₂ gas.