Abstract Submitted
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Interconnection resistance improvement by plasma treatment after etching the contact hole NAM-GUN KIM, SUNG-IL CHO, YOON-JAE KIM, CHAN-MIN LEE, JI-HEE KIM, CHEOL-KYU LEE, SEOK-WOO NAM, Samsung Electronics, PROCESS DEVELOPMENT TEAM — As the feature size diminished, it becomes important to control the interconnect resistance, especially, on the interface. Conventionally CF_4 based plasma and HF treatment have been used to remove damaged layer induced during etching the contact holes. However, these methods were limited due to contact enlargement or increment of recess depth. We developed the new treatment to improve contact resistance using H_2/N_2 plasma. The H_2/N_2 plasma assisted treatment (HAT) after etching contact holes improve the cell current 4% compared with the conventional method. Based on the XPS (X-ray Photoelectron Spectroscopy) and OES (Optical Emission Spectroscopy) analysis, it was found that HAT effectively removed the SiC layer. The atomic concentration of carbon on the surface decreases from 22.3% to 1.5% on the XPS analysis by HAT. Though the carbon concentration on the surface significantly decrease during HAT, the contact profile changed less than 5Å, so that the leakage current of gate, called as short channel effect, rarely degraded.

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