

Solution of SEM signal enhancement of buried patterns and buried defects

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Abstract:

We developed a methodology to image buried structure with band-pass backscattering electrons (BP-BSE) imaging by removing both low-energy ($<100\text{eV}$) secondary electrons (SE) and high-energy elastic BSE (EBSE) from a scanning electron microscope (SEM) image. Both SE and EBSE are mainly from sample surface, thus contribute more as noise when imaging the buried structure and buried defects. Monte-Carlo simulation confirmed our prediction. We also used an e-beam inspection (EBI) system with a high-pass energy filter (EF) to image gate-all-around (GAA) nano-sheet (NS) structures with different SiGe remain on 300mm wafers. We successfully proved that by adjusting EF settings, we could acquire BP-BSE images that enhanced of the buried SiGe. The technique can be applied for other buried structure imaging and buried defect inspection.