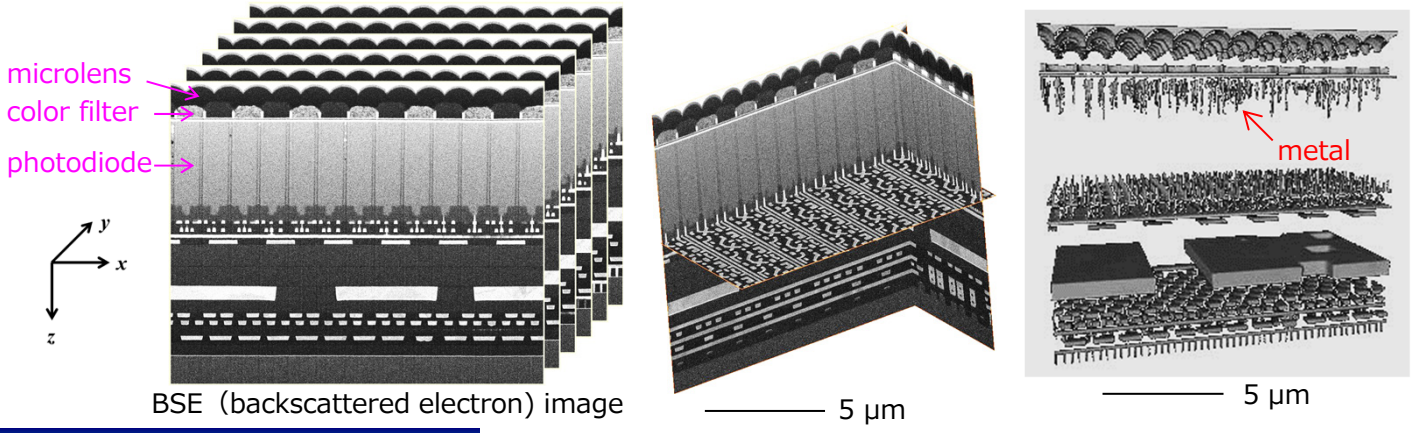
Layer analysis of image sensors using 3D-SEM

The layer analysis is generally performed by sequential observations with device delayering by mechanical polishing or chemical etching. These techniques are at risk for losing regions of the sample especially for reverse engineering of unknown device. 3D-SEM technique gives us three-dimensional information on all the layers of device without any loss of layers by delayering.

3D-SEM

3D-SEM can evaluate three-dimensional structure by reconstructing the SEM images obtained by repeated FIB milling and SEM observation.

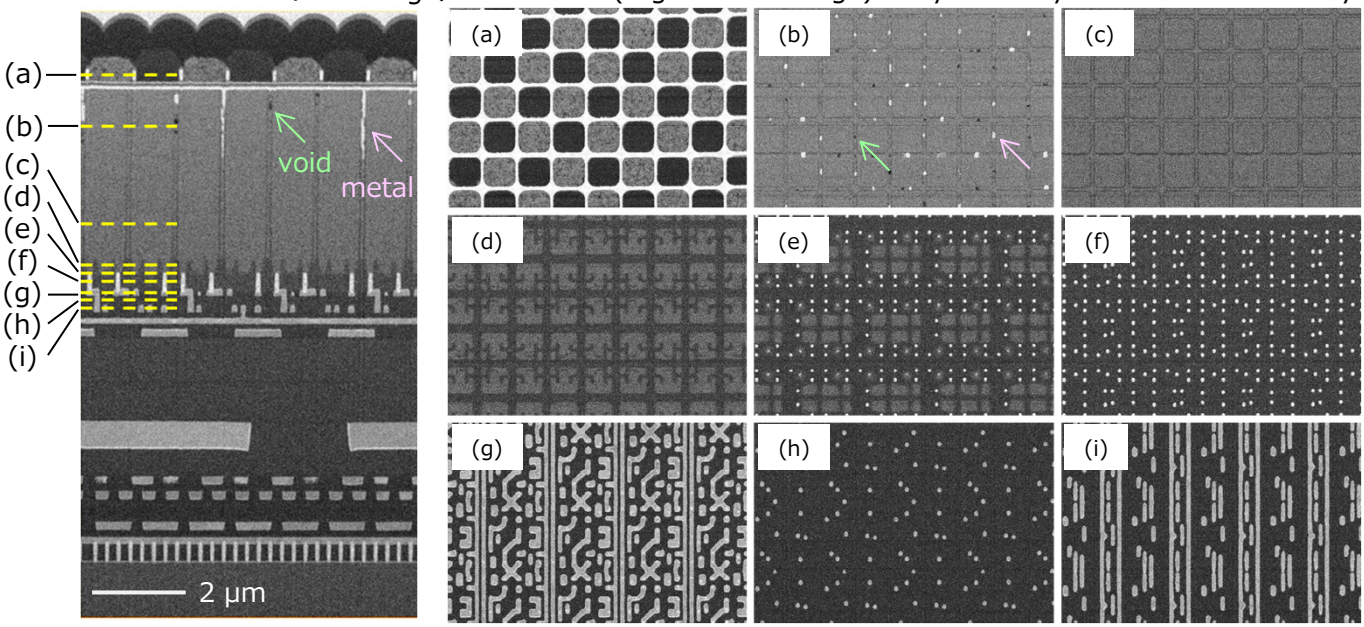
FIB milling / SEM observation | 3D reconstructed image | Volume rendered image



BSE (backscattered electron) image

Layer analysis using 3D-SEM

Cross-sectional view (BSE image) Plan view (Digital Slice image) : Layout analysis results for each layer



3D-SEM observation specifications

・Low magnification observation (maximum range) 60 μm × 60 μm × 60 μm Slice interval Approx. 300 nm	・High magnification observation 600 nm × 200 nm × 600 nm Slice interval Approx. 1 nm

Extraction numerical information is also possible

3D-SEM is optimal technique for precise layer analysis and effective prior to detailed cross-sectional observation