Abridged version

KAWASAKI STEEL TECHNICAL REPORT No.30 (August 1994) Special Issue on LSI

Al/Al Direct-Contact Via Plug Formation Using Selective Al-CVD

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Synopsis:

Direct-contact via plug of a submicron diameter with a novel via plug structure has been realized by selective aluminum chemical vapor deposition (Al-CVD). Lower and upper Al interconnects are directly connected with the plug of aluminum. Essential point of this technique is to carry out sequentially the following three processes without exposing wafers to the ambient: surface cleaning by reactive ion etching (RIE), plug formation by selective Al-CVD and sputter deposition of upper level Al film. The via structure has no heteromaterial interfaces across the current path. Electrical characteristics of the Al plug were evaluated and compared with those of the conventional W plug. The resistance of a via chain in 0.5-µm diameter was 0.24 /via, which was 1/3 that of the W-filled plug, and interface resistance was estimated to be extremely low. Electromigration (EM) tolerance of the new plug was better than that of the W plug. The direct-contact Al-CVD plug is, thus, very suitable for realizing high-performance LSI with lower process cost.

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The body can be viewed from the next page.

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