

Title (en)

IMPROVED COPPER BATH FOR ELECTROPLATING FINE CIRCUITRY ON SEMICONDUCTOR CHIPS

Title (de)

VERBESSERTES KUPFERBAD FÜR GALVANISIERUNGS-FEINSCHALTKREISE AUF HALBLEITERCHIPS

Title (fr)

BAIN DE CUIVRE AMELIORE POUR GALVANOPLASTIE DE CIRCUITS FINS SUR PUCES A SEMI-CONDUCTEURS

Publication

**EP 1665345 A2 20060607 (EN)**

Application

**EP 04784992 A 20040924**

Priority

- US 2004031398 W 20040924
- US 67241603 A 20030926

Abstract (en)

[origin: US2005067297A1] Bottom-up filling of fine Damascene trenches and vias in semiconductor chips is attained using a copper pyrophosphate electroplating bath with a single accelerating additive species present at low concentration (<5 MUM). This bath is much easier to control than the acid copper sulfate bath, which employs a complicated additive system involving a minimum of two organic additives and chloride ion (as well as significant additive breakdown products). Pyrophosphate copper deposits exhibit stable properties without annealing and are typically twice as hard as acid sulfate copper deposits, which facilitates chemical mechanical planarization. The mechanical properties and texture of the fine-grained pyrophosphate copper deposits are also much less substrate dependent, which minimizes the effects of variations and flaws in the barrier and seed layers. Attack of copper seed layers is minimized for the copper pyrophosphate bath, which operates in the pH 8 to 9 range. The resistivity of pyrophosphate and annealed acid sulfate copper deposits are substantially equivalent.

IPC 1-7

**H01L 21/00**

IPC 8 full level

**C25D 3/38** (2006.01); **C25D 3/58** (2006.01); **H01L 21/288** (2006.01); **H01L 21/768** (2006.01); **H05K 3/42** (2006.01)

CPC (source: EP KR US)

**C25D 3/38** (2013.01 - EP KR US); **C25D 3/58** (2013.01 - EP US); **H01L 21/2885** (2013.01 - EP US); **H01L 21/76877** (2013.01 - EP US); **H05K 3/423** (2013.01 - EP US)

Citation (search report)

See references of WO 2005031812A2

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR

DOCDB simple family (publication)

**US 2005067297 A1 20050331**; CA 2539481 A1 20050407; CN 1882719 A 20061220; EP 1665345 A2 20060607; KR 20060061395 A 20060607; WO 2005031812 A2 20050407; WO 2005031812 A3 20050630

DOCDB simple family (application)

**US 67241603 A 20030926**; CA 2539481 A 20040924; CN 200480034544 A 20040924; EP 04784992 A 20040924; KR 20067007932 A 20060424; US 2004031398 W 20040924