

Title (en)

PATTERN DEPENDENT SURFACE PROFILE EVOLUTION OF ELECTROCHEMICALLY DEPOSITED METAL

Title (de)

MUSTERABHAENGIGE ENTWICKLUNG DES OBERFLAECHENPROFILS VON ELEKTROCHEMISCH ABGESCHIEDENEM METAL

Title (fr)

EVOLUTION EN FONCTION DU TRACE DU PROFIL SUPERFICIEL EN METAL DE DEPOT ELECTROCHIMIQUE

Publication

EP 1225972 A2 20020731 (EN)

Application

EP 00975648 A 20000925

Priority

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Abstract (en)

[origin: WO0121294A2] A process for depositing a metal structure, such as copper interconnects, on a surface of a workplace, such as a semiconductor wafer, the workpiece surface defining a plurality of recessed microstructures. The surface of the workpiece is exposed to an electroplating bath including copper ions to be deposited on the surface and an organic additive that influences the metal ions to be preferentially deposited within the recessed microstructures relative to the remainder of the surface. Electroplating power is then provided between the exposed surface of the workpiece and the anode for a first time period such that the copper ions are deposited on the surface and nominally fill the recessed microstructures. The electroplating power is then reversed between the anode and exposed surface of the workpiece during at least a portion of a second time period to limit the deposition of further copper over the nominally filled recessed microstructures, relative to the remainder of the surface, to ameliorate the development of a "momentum plating" overburden bump of metal over the recessed microstructures. In a preferred embodiment, the reverse electroplating power is supplied in a series of reverse power pulses interspersed with forward power pulses. In addition to the pulsed reverse power application reverse power may also be applied during a sustained time period. An apparatus is also provided for carrying out the process utilizing reverse power application to ameliorate momentum plating bump formation.

[origin: WO0121294A2] A process for depositing a metal structure, such as copper interconnects, on a surface of a workpiece (10), such as a semiconductor wafer, the workpiece surface defining a plurality of recessed microstructures (14). The surface of the workpiece is exposed to an electroplating bath including copper ions to be deposited on the surface and an organic additive that influences the metal ions to be preferentially deposited within the recessed microstructures. Electroplating power is then provided between the exposed surface of the workpiece and the anode for a first time period such that the copper ions are deposited on the surface and nominally fill the recessed microstructures. The electroplating power is then reversed between the anode and exposed surface of the workpiece during at least a portion of a second time period to limit the deposition of further copper (20) over the nominally filled recessed microstructures, relative to the remainder of the surface, to ameliorate the development of a "momentum plating" overburden bump of metal over the recessed microstructures.

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