ABSTRACT

A METHOD FOR THE ANISOTROPIC ETCHING OF METAL FILMS IN THE FABRICATION OF INTERCONNECTS

The present invention discloses a method for anisotropically etching metal interconnects in the fabrication of semiconductor devices, especially ULSI interconnects having high aspect ratios. A metal film is first deposited on the appropriate layer of a semiconductor substrate by techniques well-known in the art. A mask layer is deposited over the metal film with openings defined in the mask layer for patterning of the metal film. Ions are then introduced into an exposed region of the metal film to anisotropically form a converted layer of the metal film comprising compounds of the metal. The introduction of the ions into the metal film can be performed by conventional methods, such as through the use of a reactive ion etch system or an ion implantation system, or by any other method which anisotropically forms the metal compounds. The mask layer is then removed by conventional means to leave behind the metal film having a converted layer of metal compounds. Finally, the metal compounds are selectively removed by a suitable removal means chosen for its properties in removing the metal compounds without causing significant etching or degradation of the metal film itself.

(Fig. 1B & 1C)

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