SPOTLIGHT

CMP Pad Conditioner "NS MEDRES"

1. Introduction

A CMP process is an essential part of the semiconductor manufacturing processes. A CMP pad conditioner is an expendable part. There have been demands for its greater contribution to the improvement of the CMP processes for greater stability and further cost reduction. NSC has developed a CMP pad conditioner "NS MEDRES" with its own know-how and metallurgical, bonding and other material technologies NSC has successfully developed and accumulated over the years. The CMP pad condition is now being produced and commercialized.

2. Features

(1) High Resistance to Corrosion

In-situ conditioning was a desire for the improvement of the throughput of the CMP processes, but the conventional in-situ conditioning using a pad conditioner prepared by nickel electro-plating was unable to attain the desired effect because of the corrosion of nickel.

NS MEDRES is free of such corrosion of bonding metal even in the presence of corrosive acid slurry because the bonding metal used in it has a high corrosion resistance. NS MEDRES is already used for in-situ conditioning in actual CMP mass production.

(2) Regular Array of Abrasive Grains of Diamond

The performance of conventional pad conditioners was significantly varied from conditioner to conditioner and was a factor to hinder the stability of the CMP process. NS MEDRES has a regularized array of the abrasive diamond grains, arranged at even intervals and an evenly distributed density, as shown in **Fig. 1**, to assure little difference from conditioner to conditioner.



Fig. 1 Diamond placement in CMP pad conditioner "NS MEDRES"



Fig. 2 Relative bonding strength of diamond grid

(3) Firmly Bonded Abrasive Grains of Diamond - Prevention of grains from coming off

Diamond grains, if dropped from the conditioner in the conditioning process, could easily scratch the wafers and result in poor yield. In conventional pad conditioners prepared by the electroplating of nickel, spaces among diamond grains were filled simply with a nickel layer, and the diamond grain bonding strength was low. In NS MEDRES, by contrast, a chemical bonding layer is formed on the interface between each grain and the bonding metal to attain a high bonding strength. **Fig. 2** shows the relative bonding strength of each diamond grain of different conditioners measured by a shear strength testing method. The bonding strength of NS MEDRES is incomparably higher than that of the A to D, and its diamond grains are free from dropping when serving for the conditioning.

3. Prospects

The CMP pad conditioner "NS MEDRES" is a newly developed product of the years of R&D accumulated at NSC in the metallurgical and material fields of technology covering bonding, corrosion, strength and many others. In the application of CMP technology to the rapidly progressing semiconductor manufacturing processes, NSC will continue to meet users' requirements with its products having the various properties of NS MEDRES.

For further information, contact CPM Pad Conditioner Dept. New Materials Division