Stripping Process Development using SAPS Megasonic Technology

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Abstract-Integrated circuit(IC) design, IC manufacturing and IC packaging constitute the three pillars of IC industry. With the development of chip integration and high-density circuit packages, more photolithographic technology step were used in IC industry. As we all know, the purpose of photoresist stripping is to remove photoresist (PR) residues, particles and metal which come from the pattern structures. The photoresist (PR) stripping process is an important factor after photolithography technology which plays a key role in the yield of products. Residual photoresist can cause device layer failure or even damage the device layer.

Conventional wet PR stripping, soaking and single chamber stripping is widely used for removal photoresist in advanced packaging. Wet PR stripping uses a specific chemical to dissolve the PR layer. During PR removal process, it will need 20~30min bench soaking method and 5~10min single chemical rinse to accomplish PR strip step which may lead to a low throughput.

In this work, Supercritical CO2 combined with SAPS (Space Alternated Pulse Megasonic) technology was applied for the assessment of PR stripping. The mega sonic power could pass through the deep hole of patterns or other complicated patterns with sustained energy, facilitating the removal of photoresist completely. Moreover, the optical microscope was carried out to examine the results of PR removal effects in different pattern wafers and AOI was used to evaluate first pass yield (FPY). Mega sonic energy with different powers and different applied reaction time was rigorously investigated the removal effects of photoresist.

Keywords-Advanced packaging, Photo-resist, Wet stripping, Megasonic, Solvents

I. INTRODUCTION

Conventional wet PR stripping, soaking and single chamber stripping are the common strategies for removing photoresist in advanced packaging. However, the soaking and single chamber stripping strategies are greatly restricted by their time-consuming process. It has been accepted that