

SESSION 5

METALLIZATION

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The papers in this section cover several metallization topics (namely electroplating, sputtering & evaporation) and one surface treatment & pre-cleaning topic. The session starts with a collaborative paper from Skyworks Solutions, Avago Technologies and Global Communications Semiconductor. The dynamics of surface treatments and pre-cleans for high volume wafer manufacturing will be discussed. They will also review general practices within several high volume manufacturing organizations and present guidelines on what choices for bath life and processing time are most important. The second paper is a collaboration of Qorvo and SPTS Technologies. The paper presents a simulation of wafer temperature-time profile in a PVD process using an exponential model and its applications. The simulation can give semi-quantitatively the wafer temperature at a given time at different stages in a given PVD process. So this method could be used for process optimization, PVD process comparison and cycle time reduction. The next paper in this session is from Evatec AG and discusses the stress reduction in metallization using in-situ stress measurement and plasma assisted evaporation. Unlike usual stress assessment by measuring the bending of a substrate before and after coating, in-situ measurements allow them to observe the contribution of individual layers and the evolution of stress depending on different deposition process parameters. The in-situ stress measurement capability is then used to investigate the influence of an ion-assisted process on the stress of metal films. The fourth paper, again a collaboration of Qorvo and SPTS Technologies, discusses the wafer-to-wafer metal sputter deposition process control by automatic deposition rate adjustment. First the methodology of deposition rate calculations along with sputter metal target usage is introduced. Then the derived algorithm is applied to make a real time automatic deposition rate adjustment possible. Finally results of film thickness and process capability are demonstrated. The session closes with a paper provided by Qorvo. The purpose of their work is to describe several systems designed to control bump height uniformity in a copper bump electroplating process, identify the capabilities and limitations associated with them, and provide simple solutions that result in improvements in both yield and process control.

