System and Method for Online End Point Detection for Use in Chemical Mechanical Planarization

Researchers at the University of South Florida have invented a online methodology for end point detection for use in a chemical mechanical planarization (CMP) process .This process is both robust and inexpensive while overcoming some of the drawbacks of the existing end point detection approaches.

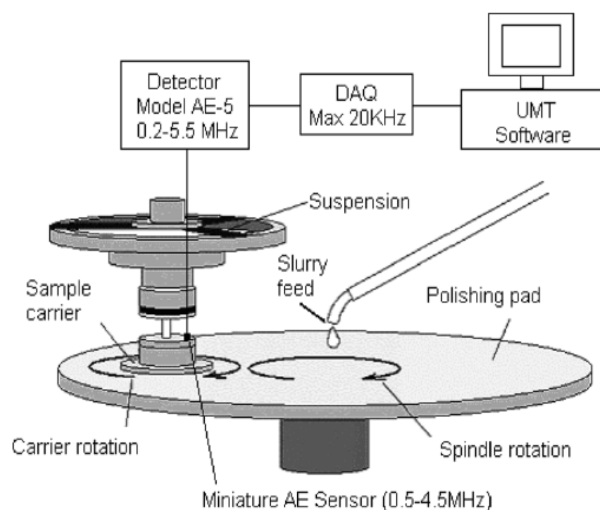
CMP has been made more challenging in recent years by complex wafer topographies, and the introduction of copper, as a substitute for aluminum, and low-k dielectrics. Some of the difficult manufacturing challenges of CMP include defects identification, end point detection and process control. End point detection is the determination of the end of polishing in a CMP process. Efficient end point detection in CMP is critical to quality and productivity of the wafer fabrication process. If the end point is not detected properly, a defect in the CMP process for metals, oxides, or dielectrics, known as over- and under-polishing, may occur. Hence, there is a need for a more efficient detection methodology.

Inventors at USF have developed a system and method for identifying a significant event in a CMP process. This novel method uses a sequential probability ratio test on the wavelet decomposed coefficient of friction (CoF) data from the CMP process. The method is made suitable for online application by developing a moving block data processing strategy, which matches the rate of data acquisition.

ADVANTAGES:

- **Low cost of metrology**
- **Accurate interpretation of in-situ sensor data**
- **Robust detection methodology**

Online Methodology



Side View of CMP Process

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