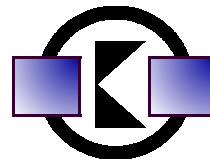


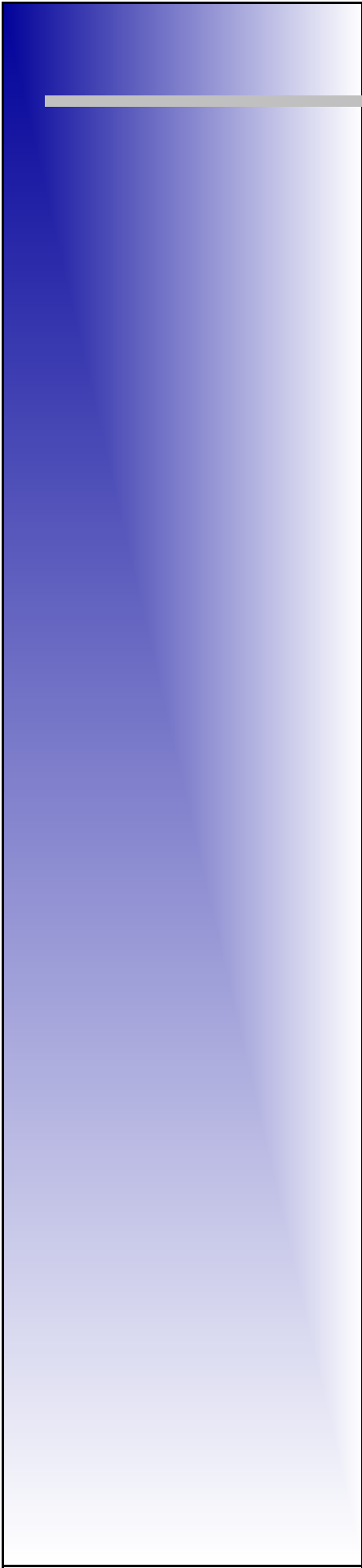
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THE GLOBAL OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 2000-2005

A continuing market analysis and assessment of
emerging technologies, focusing on back-end
consumables and processes for chemical
mechanical planarization (CMP)



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Kline & Company, Inc. has completed an in-depth analysis of the key trends impacting new and emerging materials consumed in semiconductor processes. This report includes an examination of process equipment trends and expenditures. This continuing service is a direct extension of two recent reports:

- THE OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 1998-2003
- THE GLOBAL OUTLOOK FOR DIELECTRIC MATERIALS IN SEMICONDUCTOR DEVICES, 1999-2004

While most of these technologies affect “back-end-of-the-line” (BEOL) semiconductor processing, this study will include related processes. For example, the report will also focus on shallow trench isolation (STI) and hard-disk polishing.

THE GLOBAL OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 2000-2005

is designed to help strategic planners involved in materials supply and process tool development to better understand the timing and impact of the inevitable change in semiconductor fabrication practices. Specifically, the report will provide subscribers with the following benefits:

- Accurate *five-year* predictions of the markets for consumables and equipment
- Profiles of materials and equipment suppliers
- On-site consultation with key members of the Kline consulting team

TENTATIVE TABLE OF CONTENTS

1. EXECUTIVE SUMMARY
 - Introduction
 - Time spent undergoing CMP
 - Consumption of CMP materials
 - Supplier shares
 - Outlook
2. INTRODUCTION
3. ROADMAP GOALS AFFECTING CMP
 - Introduction
 - Design rule trends
 - Trends in semiconductor materials
4. CMP TECHNOLOGY
 - Introduction
 - Early planarization methods
 - Semiconductor architecture
 - Device separators
 - Premetal
 - Interconnects
 - Embedded structures
 - DRAM structures
 - Self-aligning gate
 - Media undergoing planarization
 - Silicon dioxide
 - Silicon nitride
 - Silicon carbide
 - Hard disks
 - STI and premetal
 - Metals
 - Barrier metals
 - Polysilicon Low-k dielectrics
 - Cleaning
5. EQUIPMENT
 - Planarization tools
 - Design innovations
 - Equipment suppliers
 - Post-CMP cleaning
 - Alternative planarization tools
6. END USES
 - Overview
 - ASICs
 - Microprocessors
 - DSPs
 - MCUs
 - Flash memory
 - SRAM
 - DRAM
 - Other devices
7. SLURRIES
 - Introduction
 - Fumed silica dispersions
 - Colloidal silica dispersions
 - Alumina
 - Ceria (blends)
 - For each of the above classifications, the following detail will be provided:
 - Description
 - Applications
 - Grades and prices
 - Competing technologies
 - Distribution and packaging
 - Current consumption
 - Key consumers
 - Suppliers
 - Outlook
8. POLISHING PADS
 - Introduction
 - Applications
 - Grades and prices
 - Distribution and packaging
 - Current consumption
 - Key consumers
 - Suppliers
 - Outlook
9. PAD CONDITIONERS
 - Introduction
 - Applications
 - Grades and prices
 - Distribution and packaging
 - Current consumption
 - Key consumers
 - Suppliers
 - Outlook
10. BRUSHES
 - Introduction
 - Applications
 - Grades and prices
 - Distribution and packaging
 - Current consumption
 - Key consumers
 - Suppliers
 - Outlook
11. FILTERS
 - Introduction
 - Applications
 - Grades and prices
 - Distribution and packaging
 - Current consumption
 - Key consumers
 - Suppliers
 - Outlook
12. NON-SLURRY SOLUTIONS
 - Introduction
 - Applications
 - Grades and prices
 - Distribution and packaging
 - Current consumption
 - Key consumers
 - Suppliers
 - Outlook
13. SUPPLIERS
 - Outlook
 - Supplier shares by market segment
 - Supplier reviews

APPENDIX 1 – Forecast model map

APPENDIX 2 – List of companies interviewed

THE GLOBAL OUTLOOK FOR CMP TECHNOLOGY

THE REPORT

THE GLOBAL OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 2000-2005

provides an important review and update of Kline's original CMP report, published in late 1998.

The research for this report was conducted over the last eight months. To develop the insights necessary for this analysis we completed a total of 110 interviews with semiconductor fabricators, tool suppliers, consumable suppliers, and other technology sources. Primary research was conducted in the following countries:

- Japan
- Korea
- Taiwan
- United States

In addition, the new report adds a detailed discussion of post-CMP cleaning compounds to the group of slurries, polishing pads, cleaning brushes, conditioners, and filters that were examined in the original report. The sections on polishing pads and process equipment have been significantly expanded.

The report also takes a fresh look at the technology of ultra-large-scale integration of semiconductor devices. Is CMP technology threatened with completely new methods of fabrication? In 1998, such technology was barely on the radar scope. Today, there is a real

threat from so-called "spin planarization" processing and planar etching of UV-curable sacrificial layers. The CMP outlook must also be viewed in relation to emerging technologies for low-k dielectrics. New sections on emerging suppliers and on investment and partnering opportunities in the CMP market are also provided.

RESEARCH METHODOLOGY

Kline employed a proven, multi-method approach to this study in order to gather, analyze, and confirm the informational inputs that are required to construct a comprehensive report for ***THE GLOBAL OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 2000-2005***. The components of this multi-method approach include the following:

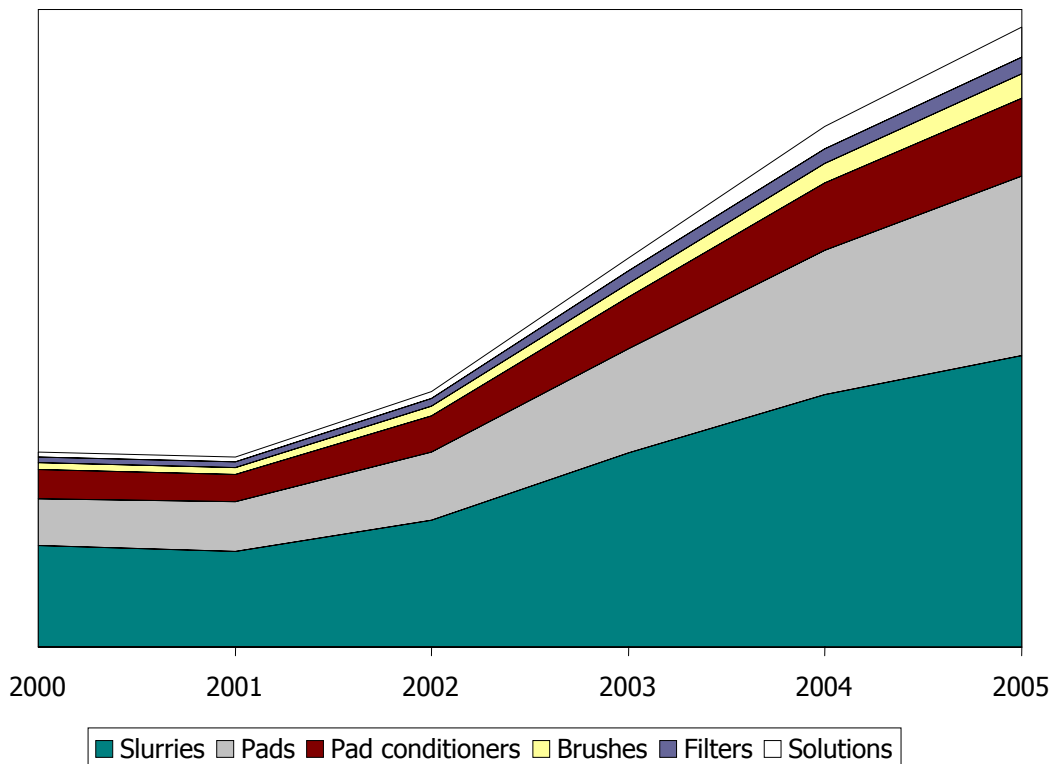
Field interviews:

The foundation of information and insight needed to complete these studies has been developed through an extensive series of field interviews (110) worldwide with key industry participants, including: (1) leading electronic device and semiconductor manufacturers; (2) manufacturers of consumables and process equipment; and (3) all pertinent government agencies and trade factors

Figure 1

GROWTH IN CMP CONSUMABLES BY PRODUCT CATEGORY

\$ Million



Analysis of key insights and industry trends:

Technology, economic, market, and supply factors have been analyzed to assess the current industry structure and to identify key trends. During this analysis, we have utilized knowledge and expertise from our previous programs to realistically predict likely future process scenarios

Market modeling:

Kline has applied the knowledge gained through primary research and a review of the technical and trade literature with a proprietary modeling algorithm that counts different types of semiconductor layers and

fabrication operations (e.g., planarization, depositions) as a means to estimate materials consumed.

Technical experts:

Dr. Mansour Moipoir has provided his expertise for this report

NOTE: Experts participating in this study do so on an individual basis, not as a representative of their respective employers.

the online version of the study, which includes unlimited access to the report contents for members of the subscribing company via Kline's website, plus one hard copy. Additional hard copies are available for a nominal fee. In addition, all subscriptions are accompanied by dedicated consulting time at a site convenient to the client, to answer questions and provide additional insight.

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obtain further information, or for more details regarding the study, please contact us at any of our locations listed on the back cover.

QUALIFICATIONS

Kline & Company, Inc. is an international business and management consulting firm offering a broad range of services to the electronics, specialty chemical, and materials industries. Kline has established a dedicated business and management consulting practice in the global electronics industry. The firm has provided consulting services to organizations active in all sectors of the industry, including electronic systems and devices, batteries, semiconductors, and printed circuit boards, as well as electronic chemicals and materials. Our headquarters are located in Little Falls, NJ, and we maintain representative offices in:

- Brussels, Belgium
- Tokyo, Japan
- Singapore
- Melbourne, Australia
- Sao Paulo, Brazil

Kline has a reputation for delivering high-quality studies and market and technology assessments. We complete approximately 200 proprietary assignments and nearly a dozen multiclient research reports each year. Over the last ten years, Kline has completed more than 50 projects related to electronic materials and technologies. Many of these assignments have investigated the market opportunities for new technologies with various performance capabilities. Other projects have evaluated new market opportunities for companies that are considering entering the electronics industry and have assisted suppliers of electronic raw materials in identifying future material needs.

THE GLOBAL OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 2000-2005 is the latest in a new series of reports on emerging electronic technologies. In late 1999, Kline completed ***THE GLOBAL OUTLOOK FOR DIELECTRIC MATERIALS IN SEMICONDUCTOR DEVICES, 1999-2004***, which analyzed the market for “back-end” dielectrics, with special attention to the new class of low-k dielectrics. This was preceded in 1998 by a groundbreaking report on the market for slurries, polishing pads, and other consumables used in CMP. This study was titled ***THE OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 1998-2003***. Both reports utilized proprietary line modeling systems that project the markets for consumables and equipment based on device-specific forecasts for interconnection layer counts, design-rule progression, and end-product demand. The rapid growth and technological development that is taking place in the semiconductor industry demands that these studies be updated regularly.

THE GLOBAL OUTLOOK FOR CMP TECHNOLOGY AND MATERIALS, 2000-2005

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