



ECO PHYSICS

Advanced Technology for SEMICONDUCTOR FAB EQUIPMENT & PROCESS CONTROL

ECO PHYSICS

is one of the leading names in measurement and control technology. The company was founded in 1989 originally with the aim of supplying the environmental and industrial markets with highly sensitive analyzers for air pollutants such as NO and NO₂. Now our products are in use worldwide for a large number of special, difficult or new applications where there are no alternative commercial suppliers, or their instruments do not achieve the required specifications. Five company divisions and subsidiaries offer products tailored to their specific markets. The latest division

Semiconductor Fab Equipment & Process Control

profits from the rich experience gained in other areas, e.g. producing standardized robust instruments for the automotive industry or highly certificated compact and simple-to-use diagnostic tools for the medical market. ECO PHYSICS's heart is its passion for innovation, an excellent R&D team with international scientific connections.



Our research is constantly opening up new horizons

Real-time, in-situ process monitoring and control for chemical mechanical polishing/planarization (CMP)

Since 1996 ECO PHYSICS and a leading edge semiconductor company have worked together to develop new methods and apparatus, which will enable CMP process monitoring and closed loop control in-situ and in real-time. This joint effort has resulted in a full system which has been patented and deployed in several manufacturing lines worldwide since 1996 (Japan, France, USA). In October 2000 ECO PHYSICS obtained the licence to further improve, produce and sell the system worldwide.



Clean Room & Process Monitoring and Control

ECO PHYSICS analyzers serve to monitor and control product quality and to ensure compliance with the various standards and purity regulations.

The world's most compact high sensitivity and fast response chemiluminescence analyzers for NO, NO₂, NH₃, amines, NMP





The COMPANY

Mission Statement

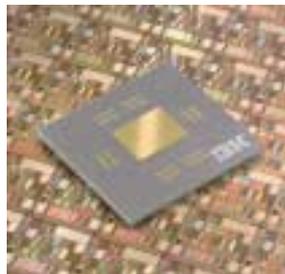
- We offer innovative solutions to new customer requirements for production automation and IT and the analysis of the environment and health.
- We develop new products and services for our basic markets and on request of our customers.
- We are only satisfied when you are too.
- With our solutions, we support worldwide modern processes and future-orientated research.
- We cooperate with the world's recognized best partners whenever requested.

Quality Commitment

Those who dedicate themselves to quality must also submit to being measured by their own standards. Our test installations and manufacturing procedures comply with international standards and requirements. All instruments bear the CE mark and are subjected to a thorough final test before delivery.

Customer Service

As a dynamic company operating internationally, we are dedicated to complete customer service. We are constantly striving for new and better ways to serve our customers, from initial order to final installation. Wherever you are located our maintenance team prevents costly manufacturing-line interruptions.



The PRODUCTS

Flexible Solutions

ECO PHYSICS has available a wide range of analysis instruments which can be fit to almost every application. Our solutions do not require changes to existing equipment, since our instruments and systems can be easily adapted to both new and older equipment. They can therefore also be used as powerful upgrade-kits in order to increase performance, safety and yield.



A Multi-level Modular Concept

Modularity is a fundamental concept and a basic policy for our products. Not only are our analyzers modularly designed, so the optional peripheral tools can be combined with the optimal system but also each module is designed to be easily adapted to several versions.

Minimal Cost of Ownership

The modular concept not only makes servicing extremely easy, but also leads to low maintenance costs, even for continuous operation. All products are designed to be very robust, highly reliable and easy to use. The very compact design and low power consumption helps to minimize your cost of ownership.





End-Point Control Physics for CMP Processes

The Challenge

Existing methods to control CMP-processes are either based on simple timing, on frictional change, on optical measurement of thickness or on measurement control in-line or off-line. All these methods need a relatively large process window. CMP processes depend on quite a large number of parameters such as downward pressure, rotational speed of the platen and the carrier, relative rotational directions, kind and condition of the pad, slurry, temperature and much more.

As an example for STI CMP all above parameters are changing. Such a process has also a very small window, so the methods mentioned above are poorly suited or very time consuming.

The big challenge has been for many years

- to fully automate the CMP process by a system including an in-situ sensor which, in real-time, precisely detects the actual polishing position to stop the process,
- to develop a method which is independent of all the parameters mentioned
- to develop a simple tool which upgrades current and future CMP machines to the latest, most efficient automation technique.

The Solution has the simple name M17.

M17, the system that provides highly sensitive and reliable closed loop control for applications such as STI and BPSG CMP processes.

M17 provides a solution for a wide range of complex problems associated with CMP process control. This has been used successfully in manufacturing and development lines worldwide since 1996. M17 is basically so reliable because it simply measures the light emitted as a result of chemical reactions occurring during the polishing process and in the M17 itself.

The basic approach to control a CMP process containing a nitride change at the stoplayer is the foundation of this M17 system. M17 has been developed jointly by ECO PHYSICS and a leading edge semiconductor company in 1996.

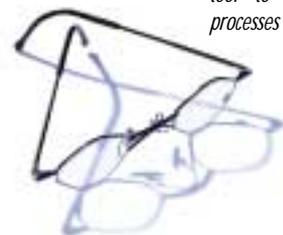
M17 is based on a process-state technology measuring the whole wafer and

therefore delivers a representative signal for active structures at the chip.

This non-intrusive system measures polishing progress in-situ and in real-time, independent of any kind of removal rate variations. M17 stops the CMP process precisely on layers containing a nitride change. It is designed to run round the clock with minimum maintenance (a few hours a year). It drastically reduces and, in many cases completely eliminates, the measurement of incoming and post CMP wafer thickness. This results in drastic increase of throughput and almost eliminates any over- or underpolish, enhancing process yield.

Both features give tremendous savings.

M17 is also an effective tool to develop new processes





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SEMICONDUCTOR FAB EQUIPMENT & PROCESS CONTROL

Your solution starts by talking to the right person.

A product is only as good as the people who make it. Our powerful development team is market-orientated and redraws the frontiers of technology day by day. This combination of curiosity that recognizes no borders and Swiss ideas about quality has brought us to the top worldwide. And gives you the certainty that with us you are in good hands.

We think of ourselves as innovative and application-orientated professionals, who offer our clients total solutions. Do talk to our specialists and get their professional advice. We look forward to hearing from you. In Switzerland, in Europe or anywhere else in the world.

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What can we do for you?

Potential applications

CMP process:

- STI
- BPSG
- Metal
- ILD

Please challenge us for new applications!

Clean-room:

- NO
- NO₂
- NMP
- NH₃
- Amines

The Solution

Ask ECO PHYSICS, the end-point control specialists – and simply install their product on your existing CMP machine. You can immediately increase throughput by a factor two or more, your yield is en-

hanced by several points, and you will save millions of dollars per year.

