AMEC

中微半导体设备（上海）股份有限公司
Advanced Micro-Fabrication Equipment Inc. China

R&D and Operations Center 全球研发制造运营中心
HQ - Shanghai
上海市浦东新区金桥出口加工区（南区）泰华路188号
188 Taihua Road, Jinqiao Export Processing Zone (South Area), Pudong New Area, Shanghai 201201, P.R.C.
Tel: +86-21-6100 1199
Fax: +86-21-6100 2205

Nanchang
江西省南昌市南昌高新技术产业开发区天祥大道699号
699 Tianxiang Avenue, Nanchang High-tech Industrial Development Zone, Nanchang, Jiangxi 330095, P.R.C.
Tel: +86-791-8211 1199
Fax: +86-791-8230 7709

Xiamen
厦门火炬高新区（翔安）产业区同龙二路888号101单位
Unit 101, 888 Tonglong Second Road, Torch Hi-Tech Industrial Zone (Xiang'an), Xiamen, Fujian 361101, P.R.C.
Tel: +86-5-92710-5282

Sales & Support Center 销售与技术支持中心
Singapore
10 Ang Mo Kio Street 65, #02-14 TechPoint Lobby, Singapore 569059
Tel: +65-6858 3113
Fax: +65-6858 3003

Japan
8F Shinagawa Center Building, 3-23-17 Takanawa, Minato-ku, Tokyo, Japan 108-0074
Tel: +81-3-5475 7505
Fax: +81-3-5475 7506

Korea
#28-85, Gajang Industry East Road, Osan City, Gyeonggi-Do, 18103 Republic of Korea
Tel: +82-31-8077 2800

Taiwan
Hsinchu Office
新竹市公道五路三段1号7楼-1
7F-1, NO.1, Sec.3, Gongdao 5th Road, Hsinchu City 30069, Taiwan
Tel: +886-3-572 3111
Fax: +886-3-572 3112

Taichung Office
台中市大雅区科雅西路29号2号215室
Room 215, 2F, No. 29, Keya West Road, Daya District, Taichung City 428, Taiwan
Tel: +886-4-2560 1560
Fax: +886-4-2560 0270

Tainan Office
台南市新市区中心路10号1楼
1F., No. 10, Zhongxin Road, Xinshi District, Tainan City 744092, Taiwan
Tel: +886-6-589 7527
Fax: +886-6-589 7528

USA
1901 South Bascom Avenue, Suite 1005, Campbell, CA 95008, USA
Tel: +1-408-412-8458

AMEC Official Wechat

www.amec-inc.com

领先的产品设计
优异的工艺性能
高效的生产能力

Innovative Design
Superior Performance
High Productivity

AMEC

证券简称：中微公司　证券代码：688012

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企业荣誉
Recognition & Awards

愿景 Vision

我们致力于开发微观加工的半导体设备，这些设备是数码时代的基础，而数码时代改变了人类的生产方式和生活方式。

We develop micro-fabrication equipment which is the foundation of the digital era that changes the way we work and live.

使命 Mission

中微致力于技术创新和产品的差异化；致力于持续开发一系列微观加工的设备，为客户和市场提供性能优越、高生产效率和高性价比的设备解决方案；并通过公司的持续发展回报员工和社会。

AMEC is committed to technology innovation and product differentiation, continually developing diverse micro-fabrication equipment that delivers high performance, high productivity and economic solutions for customers and market needs, while creating value for employees and our society.

中微半导体设备（上海）股份有限公司是一家以中国为基地、面向全球的微观加工高端设备公司。通过向全球领先的半导体和LED芯片制造商提供极具竞争力的高端设备和高质量的服务，中微为客户的技术水平提升、生产效率提高、生产成本降低和竞争力增强做出了重要贡献。中微基于在半导体装备产业多年耕耘积累的专业技术，跨足半导体芯片前端制造、先进封装、发光二极管生产、MEMS制造以及其他微观制程的高端设备领域，瞄准世界科技前沿，坚持自主创新。中微的等离子体刻蚀设备和硅通孔刻蚀设备已被广泛应用于国际一线客户从65纳米到5纳米工艺的芯片加工制造及先进封装，中微开发的用于LED和功率器件外延片生产的MOCVD设备也已在客户生产线上投入量产，并在全球氮化镓基LED MOCVD设备市场占据领先地位。中微公司的客户遍布中国大陆和台湾、新加坡、韩国、德国、意大利、俄罗斯等国家和地区。

AMEC is an innovative Asia-based semiconductor equipment company with a range of proprietary fabrication solutions designed to advance technology, increase productivity, and reduce manufacturing costs for leading global manufacturers of semiconductors and LEDs. We provide state-of-the-art equipment, process expertise, and stellar support to customers in front-end semiconductor manufacturing, back-end wafer level packaging, LED production, MEMS applications, and other semiconductor fabrication processes. AMEC is an entrenched supplier of dielectric and TSV etch tools, helping chipmakers build devices at process nodes as low as 5nm. In addition, AMEC's MOCVD tools are deployed in volume production by leading global manufacturers of LEDs and power devices, and occupy a dominant position in the GaN LED MOCVD market. AMEC products are used today by technology leaders in Chinese mainland and Taiwan region, as well as Singapore, Korea, Germany, Italy and Russia.

为65到16纳米芯片制造提供创新的刻蚀解决方案
Innovative solutions for semiconductor device fabrication at 65nm to 16nm nodes

Primo D-RIE®

作为中微第一代电介质刻蚀产品，Primo D-RIE®是12英寸双反应台多反应腔主机系统，可灵活装置多达三个双反应台反应腔（六个反应台）。每个反应腔都可以同时加工两片晶圆。该设备运用了中微具有自主知识产权的创新技术，包括甚高频和低频混合射频去耦合反应等离子体源、等离子体隔离环、以及用于控制腔体内反应环境的先进工艺组件。Primo D-RIE刻蚀设备可用于加工包括氧化硅、氮化硅及低介电系数膜层等所有的电介质材料。Primo D-RIE于2007年发布之后，由于其较低的生产成本、较高的生产效率和卓越的芯片加工性能，已在国际主流芯片生产线上投入量产。

The Primo D-RIE® system, AMEC' s first-generation dielectric etch product, is a 300mm cluster tool that can be configured with up to three dual-station process modules (PM). Each PM allows two wafers to be processed simultaneously. The product utilizes AMEC' s proprietary decoupled VHF and LF RF system plasma source, FEIS ring plasma confinement, and advanced kits to control the processing chamber environment. The Primo D-RIE system was designed for etch applications for all dielectric film stacks, including Silicon Oxide, Silicon Nitride and Low-k materials. Since its launch in 2007, Primo D-RIE has been deployed in leading fabs worldwide for its cost effectiveness and high performance in mass production.

Product Features
产品特点

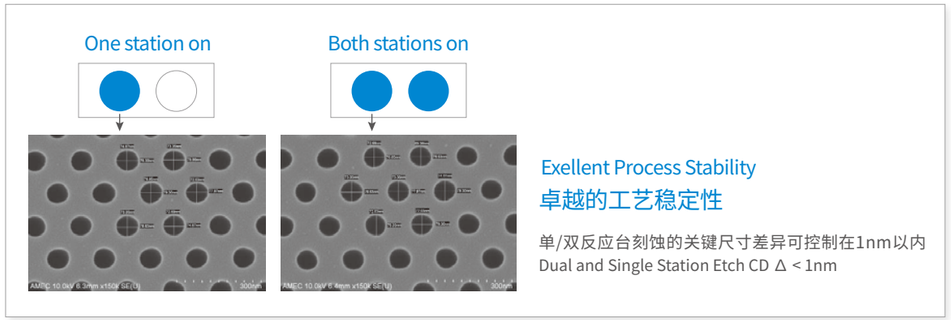
- 双反应台腔体设计具有更高的产出效率
- 双反应台独立射频系统和刻蚀终端控制系统
- 拥有自主知识产权的射频匹配系统
- 拥有自主知识产权的等离子体隔离技术

- Dual-station chamber design with more effective throughput
- Independent process station RF system (bottom HF and LF) and end-point control systems
- Proprietary RF match system
- Proprietary plasma-confinement technology

Competitive Advantages
竞争优势

- 高生产效率，低生产成本（CoO）
- 设备占地面积小
- 一体整合的除胶能力及表面电荷减除能力（Primo iDEA®系统）

- High throughput with low cost of ownership (CoO)
- Small footprint
- Integrated strip capability and surface charge reduction capability (Primo iDEA® System)



Exellent Process Stability
卓越的工艺稳定性

单/双反应台刻蚀的关键尺寸差异可控制在1nm以内
Dual and Single Station Etch CD Δ < 1nm

为40到5纳米芯片制造提供创新的刻蚀解决方案
Innovative solutions for semiconductor device fabrication at 40nm to 5nm nodes

Primo AD-RIE®

Primo AD-RIE®是中微第二代电介质刻蚀产品。基于已被认可的Primo D-RIE®刻蚀设备，Primo AD-RIE应用了具有自主知识产权的新设计，配备了可切换双低频射频源，优化了上电极气流分布以及下电极温控系统。为了使生产效率最大化，Primo AD-RIE系统同样可以灵活地装置多达三个双反应台反应腔（即六个反应台）。Primo AD-RIE具备能够满足最新一代芯片器件制造需求的先进性能，目前已被广泛应用于40到14纳米后段制程。

此外，中微基于Primo AD-RIE开发了子系列产品Primo AD-RIE-e和Primo AD-RIE-cr。Primo AD-RIE-e配备了自主研发的四区动态静电吸盘，每一制程步骤可独立进行控温，以达到更高的刻蚀均匀度和刻蚀选择比，目前已应用于5纳米前段和中段的掩膜层刻蚀的开发及量产。Primo AD-RIE-cr配备了拥有自主知识产权涂层技术的抗腐蚀反应腔，可应对电介质材料、金属及金属氧化物材料复杂结构的刻蚀要求。

The Primo AD-RIE® system is AMEC's second-generation dielectric etch product. Built upon the proven D-RIE architecture, the system embodies new proprietary designs featuring advanced capabilities such as switchable dual-low-frequency RF generators, multi-zone gas distribution, and dual-chiller temperature control system. To maximize productivity, the AD-RIE system employs a cluster tool design that can be configured with up to three dual-station process modules (or six processing stations) per system. The AD-RIE product delivers the advanced capabilities for new generation IC device manufacturing requirements. Today's customers are running the tool for 40-14nm BEOL applications.

Furthermore, AMEC developed Primo AD-RIE series: Primo AD-RIE-e and Primo AD-RIE-cr. Primo AD-RIE-e is configured with step-by-step temperature control 4-zone dynamic ESC, which helps improve etch uniformity and selectivity with wider process window. The tool has been used for R&D and mass production of mask etching for 5nm FOEL as well as MOL applications. The Primo AD-RIE-cr features corrosion resist chamber with AMEC's proprietary surface coating technology, which offers solutions for dielectric, metal and metal oxide complicated structure etch.

Product Features
产品特点

- 双反应台腔体设计具有更高的产出效率
- 双低频功率切换系统，用于制程分步骤优化
- 脉冲射频系统选项
- 多区气体分配调节系统
- 静电吸盘双区冷却装置
- 低金属污染工艺组件选项
- 每一步骤可独立进行控温的四区动态静电吸盘（Primo AD-RIE-e）
- 拥有自主知识产权涂层技术的抗腐蚀反应腔（Primo AD-RIE-cr）
- 一体整合的除胶能力及表面电荷减除能力（Primo iDEA®系统）

- Dual-station chamber design with more effective throughput
- Switchable bias RF system for by-step recipe control
- Pulsing RF system as option
- Multi-zone gas distribution system
- Dual zone ESC for temperature control
- Dynamic ESC option for step-by-step temperature control (Primo AD-RIE-e)
- Corrosion resist chamber with proprietary surface coating technology (Primo AD-RIE-cr)
- Integrated strip capability and surface charge reduction capability (Primo iDEA® System)

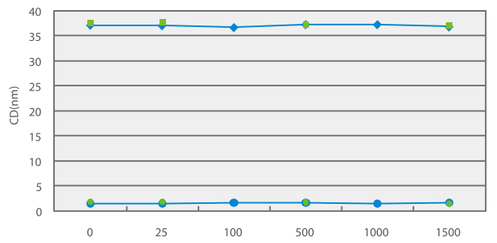
Competitive Advantages
竞争优势

- 双低频功率分步骤切换系统，以适用于更广的制程范围（特别是Trench/Via All-in-one制程）
- 卓越的工艺可调性和稳定性，以满足先进工艺标准
- 高生产效率，低生产成本（CoO）
- 扩展机型Primo AD-RIE-e, Primo AD-RIE-cr 和 Primo iDEA®，可应用于不同特殊制程

- In-situ high-and-low bias-frequency switch system, for wider process window (especially Trench/Via All-in-one applications)
- Excellent process control, tunability and stability for critical processing criteria
- High throughput and low cost of ownership (CoO)
- Primo AD-RIE series for various typical applications: Primo AD-RIE-e, Primo AD-RIE-cr and Primo iDEA®

Pattern Wafer Result (nm)	Burn-in Wafer Counts (per station)											
	0		25		100		500		1000		1500	
	PMA1	PMA2	PMA1	PMA2	PMA1	PMA2	PMA1	PMA2	PMA1	PMA2	PMA1	PMA2
CD (T25%)	37.1	37.6	37.0	37.8	36.7	n.a	37.3	37.3	37.2	n.a	36.8	37.1
3 sigma	1.5	1.8	1.5	1.8	1.7	n.a	1.7	1.8	1.5	n.a	1.6	1.5

CD and CD Uniformity (3 sigma)



卓越的关键尺度刻蚀均匀度 3 sigma < 1.8纳米

Burn-in Wafer Counts（Per Station）

	CD-A1	CD-A2	CDU-A1	CDU-A2
0	37.13	37.59	1.48	1.82
25	37.04	37.75	1.54	1.78
100	36.67		1.66	
500	37.25	37.29	1.7	1.75
1000	37.24		1.53	
1500	36.8	37.1	1.62	1.52

为26到16纳米芯片制造提供创新的刻蚀解决方案
Innovative solutions for semiconductor device fabrication at 26nm to 16nm nodes

Primo SSC AD-RIE®

Primo SSC AD-RIE® 是中微于2013年推出的单反应台电介质刻蚀产品，在Primo AD-RIE®产品技术和Primo平台概念的基础上，通过在一个平台上集成六个单反应台以达到产能最大化。除了可独立输运气体的单反应台腔体设计，为应对2x纳米以下特别是接触孔刻蚀等关键制程的挑战，该设备还集成了以下特征：同步脉冲射频系统、可冷却聚焦环工艺组件和甚低压气体抽运系统。Primo SSC AD-RIE有利于处理多层薄膜刻蚀的微负载问题、极端边缘形貌问题以及接触孔刻蚀的终端控制问题。Primo SSC AD-RIE 已在主流客户16纳米芯片生产线上稳定量产。

The Primo SSC AD-RIE® system is AMEC' s Single Station Chamber, dielectric etch product launched in 2013. The tool deploys AD-RIE product technology and the Primo platform concept to maximize productivity by supporting six etch processing stations on one platform. The SSC AD-RIE tool features a unique design of independent chambers for dedicated gas delivery and pumping systems control. New features, like synchronized RF pulsing, cooled focus ring process kits, and a larger capacity turbo pump to deliver proven benefits for critical application requirements at 2xnm and beyond, especially for via and contact etch. The SSC AD-RIE tool is engineered to address micro-loading concerns for multi-layer film etching, extreme-edge profile issues, and etch stop control for critical contact etching in advanced memory devices. The combination of technology and productivity helped smooth adoption of the Primo SSC AD-RIE, and the system is already in stable mass production at the 16nm node in leading customer fabs.

Product Features
产品特点

- 具有独立气体输运系统的单反应台腔体设计
- 多区气体调节以及双区静电吸盘温度控制
- 高抽气率，大容量分子泵
- 双级同步脉冲射频系统（低频和高频）
- 可冷却聚焦环工艺组件，提升晶圆边缘性能
- 高上下电极面积比，以应用于高深宽比结构刻蚀

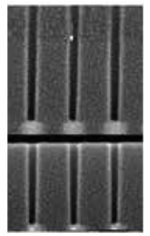
- Dedicated gas delivery and pumping for each processing station
- Multi-zone gas tuning and dual-zone ESC temperature control
- High pumping conductance with large capacity turbo pump
- Synchronized dual-level RF pulsing (bias and source) system
- Cooled focus ring process kit option for extreme-edge wafer CD control
- High upper/lower electrode area ratio for high aspect ratio (HAR) structure etch

Competitive Advantages
竞争优势

- 高电介质材料刻蚀速率，多手段刻蚀均匀度调节
- 双级同步脉冲射频系统
- 先进气体抽运系统，以进一步扩大工艺窗口
- 中高深宽比结构刻蚀的低成本解决方案

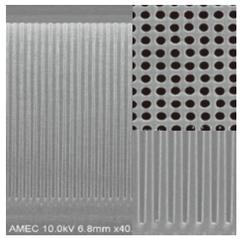
- High dielectric material etch rate, multiple functions for etch uniformity tuning
- Synchronized dual-level RF pulsing system
- Higher chamber flow conductance design for wider etch stop window
- Low-cost solution for middle and high aspect ratio (HAR) structure etch

2X纳米闪存关键接触通孔刻蚀
2X nm Flash Critical Contact Etch

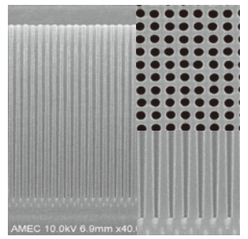


2X纳米存储器深孔刻蚀（DRAM）
2X nm Storage Node Etch (DRAM)

Center



Edge



为NAND和DRAM芯片制造提供创新的刻蚀解决方案
Innovative solutions for NAND and DRAM semiconductor device fabrication

Primo HD-RIE®

Primo HD-RIE® 是中微于 2015 年推出的新一代电介质刻蚀产品，是在 Primo SSC AD-RIE® 设计基础上实现的具有六个单反应台腔体的系统，定位于为中高深宽比刻蚀提供综合解决方案。该设备具有以下新特性：更高的同步脉冲射频功率、高功率高温静电托盘、气体脉冲、多区气体调节、可冷却聚焦环工艺组件和更稳定的上电极温度控制等。Primo HD-RIE 在 3D-NAND 及 DRAM 中高深宽比沟槽及深孔刻蚀上表现优异，在一些关键制程上已实现量产。

The Primo HD-RIE® system is AMEC' s latest-generation dielectric etch product, launched in 2015. Based on Primo SSC AD-RIE® platform with six etch processing stations capability to maximize productivity, the tool is designed to provide comprehensive solutions for middle and high aspect ratio (HAR) structure etch. New features include: High power synchronized RF pulsing, high power and high temperature ESC, gas pulsing, multiple-zone gas distribution, cooled focus ring process kits and enhanced lid temperature control. Primo HD-RIE has superb performance in middle and high aspect ratio (HAR) etch for 3D NAND and DRAM applications. The tool has already been used for critical applications in mass production.

Product Features
产品特点

- 具有独立气体输运系统的单反应台腔体设计
- 多区气体调节以及双区ESC温度控制
- 高功率以及高温静电吸盘
- 气体脉冲
- 双级同步脉冲射频系统，甚高功率的低频射频脉冲以提供高离子轰击能量
- 稳定的上电极温度控制系统
- 可冷却聚焦环以防止硅片边缘刻蚀停止
- 高上下电极面积比，以应用于中高深宽比刻蚀

- Dedicated gas delivery and pumping for each processing station
- Multi-zone gas feed and dual-zone ESC temperature control
- High power and high temperature ESC
- Gas pulsing system
- Synchronized dual-level RF pulsing (bias and source) with high bias power to enhance ion energy
- Stable lid temperature control
- Cooled focus ring process kit option for prevention of wafer extreme-edge etch unopen
- High upper/lower electrode area ratio for middle and high aspect ratio (HAR) structure etch

Competitive Advantages
竞争优势

- 高电介质材料刻蚀速率，多手段刻蚀均匀度调节
- 高粒子轰击能量，以扩大高深宽比刻蚀工艺窗口
- 气体脉冲系统，提供更灵活的工艺控制方案
- 应对特殊工艺的高温高功率静电吸盘选项

- High dielectric material etch rate, multiple functions for etch uniformity tuning
- High power synchronized dual-level RF pulsing, high ion energy to enlarge process window
- Gas pulsing system with flexible process control and enlarged process window
- High power and high temperature ESC

为芯片刻蚀和光刻胶移除提供创新的整合解决方案　Innovative interaged solutions for etch and photo-resist removal

Primo iDEA®（即“双反应台刻蚀除胶一体机”）源于中微的一个新理念，即：将一个或两个双反应台 D-RIE 或 AD-RIE 工艺模块、和一个远程等离子体源除胶器（DsA）反应腔整合在同一个平台上。中微的远程等离子体源除胶器采用了双反应台腔体设计，顶置的远程等离子体源（RPS）产生的活性反应物质，被均匀地输送到晶圆表面以移除光刻胶。这种方法能够提高光刻胶移除效率，并降低等离子体直接接触晶圆的机会。这对于一些客户来说尤为重要，其芯片器件对表面电荷极其敏感，存在等离子体诱发损伤（PID）的潜在风险。为了解决这方面的顾虑，客户通常要付出巨大的人力和物力修改整合方案，或者为每个步骤（例如光刻胶移除）添置专用设备。拥有 Primo iDEA 整合系统后，客户可以在同一个平台上灵活地进行芯片刻蚀和光刻胶移除，显著减少设备占地面积，提高生产效率。Primo iDEA 提供了极具成本优势的解决方案。

iDEA stands for “integrated Dual-station Etch and Asher”. It represents a new concept developed by AMEC that integrates one or two dual-station D-RIE or AD-RIE process modules with a DsA (“Downstream Asher”) chamber on the same platform. AMEC’ s DsA design is a dual-station chamber that utilizes a top-mounted remote plasma source (“RPS”) to create reactive species that are then uniformly delivered to the wafer surface for photo-resist removal. This approach not only effectively removes the photo-resist material, but also offers less direct plasma exposure to the wafer. This is important for customers running devices that are highly sensitive to surface charge build-up and potential risk of plasma-induced damage (PID). Avoiding PID can involve exhaustive and expensive efforts to modify integration schemes or add dedicated machines for steps such as photo-resist removal. The fully integrated Primo iDEA® system offers a cost-effective solution to perform etch processing and dedicated photo-resist removal within the same platform.

Product Features
产品特点

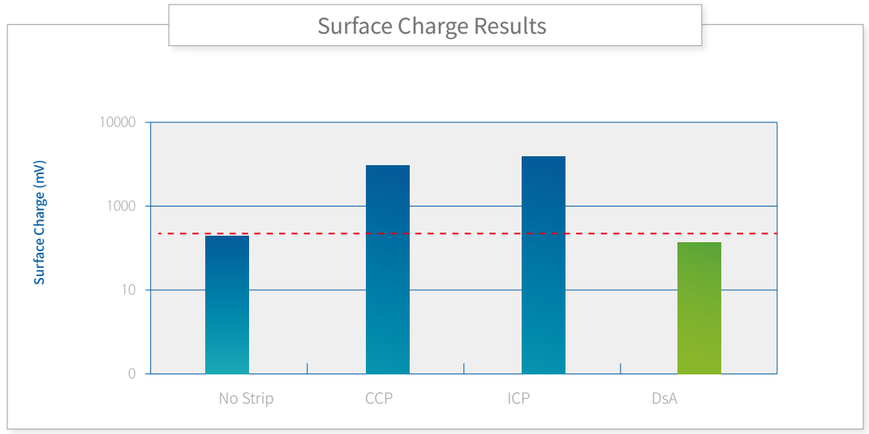
- 远程等离子体源
- 高效率除胶
- 高效离子隔滤，以避免对器件造成等离子体诱发损伤

- Remote plasma source Asher
- High photoresist removal rate
- Preventing plasma induced damage (PID)

Competitive Advantages
竞争优势

- 双反应台刻蚀与除胶整合一体机，显著减小占地面积
- 使用Primo iDEA®系统设计以代替单独的刻蚀和除胶系统，节省成本20%以上

- Small footprint with Asher and process chamber integrated system
- 20% CoO savings by using Primo iDEA® system design instead of separate individual tools



为高性能、高产能的深硅刻蚀产品　High-productivity solution for deep silicon etching

Primo TSV200E®　Primo TSV300E®

硅通孔技术已经成为先进封装应用的关键技术，应用于CMOS图像传感器、2.5D、三维芯片和芯片切割等领域。Primo TSV™是中微推出的首款用于高性能硅通孔刻蚀应用的高密度等离子体硅通孔刻蚀设备。每台系统可配置多达三个双反应台的反应腔。每个反应腔可同时加工两片晶圆。中微提供的8英寸和12英寸硅通孔刻蚀设备，均可刻蚀孔径从低至1微米以下到几百微米、深度可达几百微米的孔洞，并具有工艺协调性，可根据客户的需求产生不同的刻蚀形状（例如垂直、圆锥形和锥形等）。Primo TSV还具有多种独特的功能，诸如预热反应台、晶圆边缘保护环、低频射频脉冲、侧引入气体均匀化技术等，为TSV应用提供所需的高技术、灵活性和生产能力。

Through Silicon Via (TSV) has become a key technology for advanced packaging applications for various products such as CMOS image sensors, 2.5DICs, 3DICs and plasma dicing. The Primo TSV™ tool is AMEC' s first high-density plasma TSV etch product for high-performance TSV applications. The system employs a cluster configuration design which allows for up to three dual-station process modules to be attached to the main frame. Each module can process two wafers simultaneously. AMEC offers 200mm and 300mm TSV production tools capable of etching holes with CDs ranging from hundreds of microns down to <1um, and depth of up to several hundred microns. In addition, with its strong process-tuning capabilities, the tool can generate diverse profiles based on customer requirements (i.e., vertical, cone-shaped, tapered, and more). Finally, with unique features, such as a pre-heating station, wafer-edge protection ring, and low-frequency RF pulsing bias and side gas feed, the Primo TSV is an ideal tool to deliver the technology, flexibility, and productivity needed for the TSV market.

Product Features
产品特点

- 电感式耦合高密度等离子体源的双反应台刻蚀腔
- 高功率射频等离子体源，并具有连续或脉冲的射频偏压
- 具有快速气体转换的内置气箱
- 晶圆边缘保护环
- 制程终端光学控制系统
- 可调节的双发射天线

- Dual stations with inductively-coupled plasma source
- High-power source RF and continuous wave or pulsed bias RF
- On-board gas box with advanced fast gas switching
- Wafer edge protection ring
- Optical endpoint control system
- Tunable dual coil

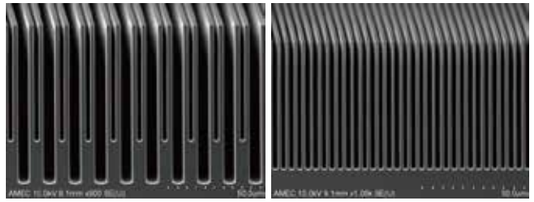
Competitive Advantages
竞争优势

- 具有适合不同应用的工艺调整性
- 高生产力的主机使每台系统的产能最大化
- 同一反应腔内融合了Bosch以及恒稳态制程的工艺性能
- 可从200mm升级到300mm

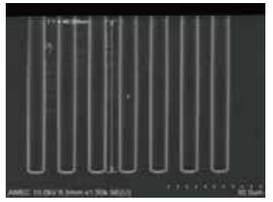
- Process tunability for diverse applications
- High-productivity mainframe for maximum throughput per system
- Bosch and steady-state processing capabilities within the same chamber
- Easily upgradable from 200mm to 300mm

多种不同应用的TSV刻蚀结果
TSV Etch Results for Various Applications

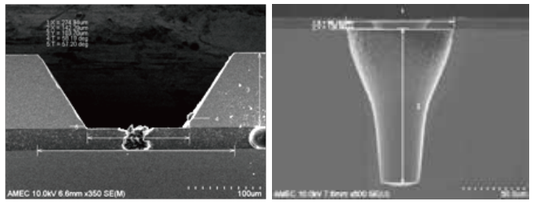
MEMS



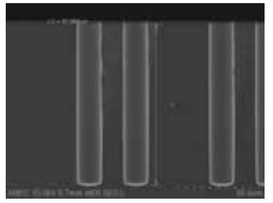
3D



CIS



2.5D



为 1X纳米及以下逻辑和存储器件刻蚀应用提供创新的解决方案
Innovative etch solution for logic and DRAM devices at 1x and beyond

Primo nanova®

Primo nanova® 是中微基于电感耦合（ICP）技术研发的 12 英寸刻蚀设备。它可以配置多达六个刻蚀反应腔和两个可选的除胶反应腔。其中刻蚀反应腔采用了轴对称设计，具有高反应气体通量。ICP 发射天线采用了中微具有自主知识产权的低电容耦合 3D 线圈设计，可实现对离子浓度和离子能量的高度独立控制。反应腔内部涂有高致密性、耐等离子体侵蚀的材料，以获得更高的工艺重复性和生产率。下电极采用了能实现多区动态温控的静电吸盘或可选用能实现更多区域温度调节的 Durga 静电吸盘，使加工出的晶圆内的关键尺寸达到高度均匀性。晶圆边缘可选用能调节形貌倾斜角度的 AEIT 装置。Primo nanova® 适用于 1X 纳米及以下的逻辑芯片、1X 纳米的 DRAM 存储芯片以及 128P 及以上的 3DNAND 存储芯片的刻蚀。

The Primo nanova® tool is AMEC's advanced 300mm etch product based on Inductively Coupled Plasma (ICP) technology. It is a cluster tool which can be configured with up to six chambers and two optional on-board integrated strip chambers. The chamber is symmetrical in design with high flow conductance. The ICP coils employ AMEC's proprietary low capacitive coupling 3D coil design which enables more independent ion density and ion energy control. The chamber interior is coated with high-density plasma-resistant material for more robust process repeatability and more steady productivity. To achieve good in-wafer CD uniformity, the lower cathode is equipped with the dynamic multi-zone temperature-controlled ESC (electrostatic chuck) or the Durga ESC with more locally controlled zones. The impedance of the FR set is tunable for wafer edge profile tilting control (AEIT). The product is intended for 1x or beyond etch applications in logic, DRAM memory device, and 3D NAND over 128 Pairs.

Product Features
产品特点

- 低电容耦合3D线圈设计
- 高抽速大容量涡轮泵
- 精密的腔体温控系统
- 先进的高致密性、耐等离子体侵蚀涂层工艺
- 多区细分的高动态范围温控静电吸盘
- 阻抗可调聚焦环设计AEIT
- 切换式双频偏压系统
- 可选的集成除胶反应腔
- 可选的Durga ESC

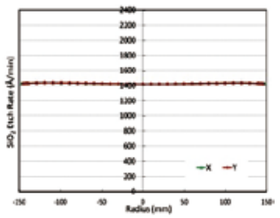
- Truly symmetric chamber design
- Low capacitive coupling 3D coil design
- High pumping speed with large capacity turbo pump (TMP)
- Precise chamber wall temperature control
- Advanced plasma-resistant interior coating
- Multi-zone temperature-controlled ESC
- Active impedance tuned focus ring design (AEIT)
- Switchable dual frequency RF biasing
- Integrated dual strippers
- Durga ESC ready for selecting

Competitive Advantages
竞争优势

- 离子浓度和离子能量独立可控
- 高排气量和更宽的工艺窗口
- 超凡的刻蚀均匀性
- 优异的高深宽比刻蚀性能
- 高生产效率，低生产成本（CoO）

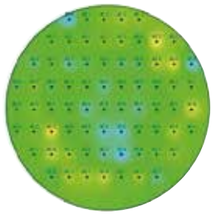
- More independent ion energy and ion density controllability
- Higher pumping conductance for wider process window
- Excellent etch uniformity
- Superior profile control for high aspect ratio applications
- High productivity platform with low cost of ownership (CoO)

SiO_2 Etch Rate Uniformity



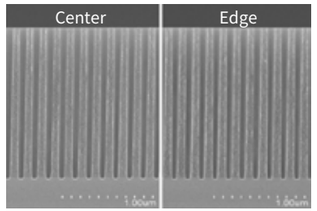
Uniformity: ±0.7%

QPT Trim/Core Etch for Logic



AEI CDU: 0.77nm(3σ)

3D NAND Carbon Mask Open



Uniform and Bow Free Profile

为功率器件、逻辑芯片和存储芯片等应用提供高性价比的刻蚀解决方案
Cost-effective etch solution for FEOL/BEOL conductive/dielectric film etch applications for IC devices

Primo Twin-Star®

Primo Twin-Star® 是中微基于电感耦合（ICP）技术研发的 12 英寸刻蚀设备。它可以配置多达三个具有双反应台的刻蚀反应腔和两个可选的除胶反应腔。每个刻蚀反应腔可同时加工一片或两片晶圆并取得高度均匀和一致的结果。ICP 发射天线采用了中微具有自主知识产权的低电容耦合 3D 线圈设计，可实现对离子浓度和离子能量的高度独立控制。设备还采用了可实现多区动态温控的静电吸盘，使加工出的集成电路器件的关键尺寸达到高度均匀性。反应腔内部涂有高致密性、耐等离子体侵蚀材料，以获得更高的工艺重复性和生产率。Primo Twin-Star® 适用于各种尺寸和深度的硅结构刻蚀以及逻辑和存储芯片的多种导体和介质薄膜刻蚀。此外，该产品和单反应台腔体相比还具有明显的低成本优势。

The Primo Twin-Star® system is AMEC's advanced 300mm etch product based on Inductively Coupled Plasma (ICP) technology. It is a cluster tool that can be configured with up to three dual-station chambers and two optional on-board integrated strip chambers. Each dual-station chamber can process one or two wafers at the same time with highly uniform and identical results. The ICP coils employ AMEC's proprietary low capacitive coupling 3D coil design which enables more independent ion density and ion energy control. The electrostatic chuck has multi-zones with independent and dynamic temperature settings which enhances CD control. The chamber interior is coated with high-density plasma-resistant material for more robust process repeatability and more steady productivity. The product is intended for etching Si with various CD and depths in CIS and power device, and thin conductive/dielectric films for various logic and DRAM IC devices. It has significant cost advantages compared to single-station chamber product.

Product Features
产品特点

- 双反应台腔体设计
- 低电容耦合3D线圈设计
- 高抽速大容量涡轮泵
- 双通道进气
- 精密的腔体温控和RF窗口温控系统
- 先进的高致密性、耐等离子体侵蚀涂层工艺
- 多区动态温控静电吸盘
- 13兆赫或400千赫脉冲偏压系统
- 可选的集成除胶反应腔

- Dual-station chamber design
- Low capacitive coupling dual 3D coil design
- High pumping speed with large capacity turbo pump (TMP)
- Dual-zone gas injection
- Precise chamber wall and RF window temperature control
- Advanced plasma-resistant interior coating
- Dynamic temperature-controlled ESC
- 13M or 400k pulsing RF biasing
- Integrated dual strippers

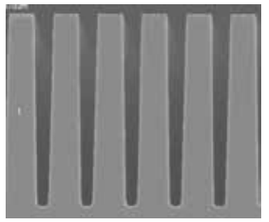
Competitive Advantages
竞争优势

- 离子浓度和离子能量独立可控
- 高排气量和更宽的工艺窗口
- 超凡的刻蚀均匀性
- 优异的高深宽比刻蚀性能
- 高生产效率，低生产成本（CoO）

- More independent ion energy and ion density controllability
- Higher pumping conductance for wider process window
- Excellent etch uniformity
- Superior profile control for high aspect ratio application
- High throughput and low cost-of-ownership (CoO)

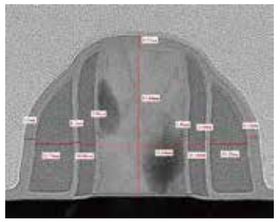
多种不同应用的Primo Twin-Star刻蚀结果
Primo Twin-Star Etch Results for Various Applications

Power MOS



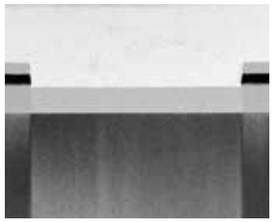
Deep Si trench etch

Logic



SiN Spacer etch

DRAM



SiN/W/TiN Etch

被主流外延片生产商采用并进行大批量LED和功率器件外延片生产的国产MOCVD 设备
MOCVD solution for LED and power device volume production

PRISMO D-BLUE®

中微具有自主知识产权的 Prismo D-BLUE® MOCVD 设备可配置多达 4 个反应腔，可同时加工 56 片 4 英寸晶片，其工艺能力还能延展到 6 英寸或 8 英寸外延晶片。每个反应腔都可以独立控制，这一设计具备卓越的生产灵活性。Prismo D-BLUE 是率先被主流外延片生产商采用并进行大批量 LED 和功率器件外延片生产的国产 MOCVD 设备。

With its patented architecture, the Prismo D- BLUE® MOCVD system can accommodate up to 4 reactors, and process up to 56x4” wafers simultaneously. It is extendible to 6” and 8” wafer processing. Each reactor is controlled independently—an inventive design that enables exceptional manufacturing flexibility. The Prismo D- BLUE MOCVD system is the industry’ s first MOCVD tool that was pioneered, developed and manufactured in China, and is now used by major LED and power device customers for volume production.

Product Features
产品特点

- 可独立控制的反应腔运行模式
- 自主的实时监控系统
- 精准的参数控制
- 全自动化处理
- 符合半导体标准的软件控制系统

- Independently controllable reactors
- Advanced in-situ, real-time monitoring system
- Precise process parameters control
- Automated and programmable maintenance routines
- SEMI S2 certified

Competitive Advantages
竞争优势

- 优异的工艺重复性，简化工艺调整需求，提高产品良率
- 19英寸大尺寸托盘极大地提高了设备单位产能，降低了生产成本
- 集成顶盖升降机构，简化设备维护，提高设备利用率
- 符合SEMI S2安全标准，提升设备的安全性能

- Superb process repeatability, simplified process adjustment and improved production yield
- High productivity, high throughput and low cost with 480mm susceptor
- Integrated lid lifting mechanism, simplified tool maintenance and maximized equipment utilization
- SEMI S2 certified with enhanced tool safety performance

用于LED外延片大规模量产的MOCVD设备　MOCVD solution for high-volume LED production

PRISMO A7®

中微具有自主知识产权的 Prismo A7® MOCVD 设备可配置多达 4 个反应腔，可同时加工 136 片 4 英寸晶片或 56 片 6 英寸晶片，其工艺能力还能延展到生长 8 英寸外延晶片。每个反应腔都可以独立控制，这一创新设计具备卓越的生产灵活性。

配备了 716 毫米托盘的中微 Prismo A7 MOCVD 设备专为 LED 高产能而设计，每个反应腔的产量是前一代 MOCVD 设备 Prismo D- BLUE® 的 2 倍多，极大地提高了单位产能，能有效降低 LED 外延片的生产成本。

With its patented architecture, the Prismo A7® MOCVD system can accommodate up to 4 reactors and process up to 136x4” wafers or 56x6” wafers simultaneously. It is extendible to 8” wafer processing. Each reactor is controlled independently – a novel design that enables exceptional manufacturing flexibility.

The Prismo A7 MOCVD system is engineered for high throughput LED production with its 716mm diameter susceptor. It delivers high-productivity, high-throughput and low-energy-consumption solutions for LED production. Throughput performance is more than twice compared with AMEC’ s first-generation MOCVD tool (Prismo D- BLUE®).

Product Features
产品特点

- 可独立控制的反应腔运行模式
- 自主的实时监控系统
- 精准的参数控制
- 全自动化处理
- 符合半导体标准的软件控制系统

- Independently controllable reactors
- Industry advanced in-situ, real-time monitoring system
- Precise process parameters control
- Automated and programmable maintenance routines
- SEMI S2 certified with enhanced tool safety performance

Competitive Advantages
竞争优势

- 优异的工艺重复性，简化工艺调整需求，提高产品良率
- 28英寸超大尺寸托盘，产量是前一代MOCVD设备Prismo D- BLUE®的2倍多，极大地降低了生产成本
- 集成顶盖升降机构，简化设备维护，提高设备利用率
- 符合SEMI S2安全标准，提升设备的安全性能

- Superb process repeatability, simplified tool maintenance and improved production yield
- High throughput and low cost with its 716mm diameter susceptor, doubled throughput compared with AMEC’ s first-generation MOCVD tool (Prismo D-BLUE®)
- Integrated lid lifting mechanism, simplified tool maintenance and maximized tool utilization
- SEMI S2 certified with enhanced tool safety performance

用于深紫外LED外延片量产的MOCVD设备　　MOCVD solution for deep UV LED mass production

PRISMO HiT3®

中微具有自主知识产权的 Prismo HiT3® MOCVD 设备，是适用于高质量氮化铝和高铝组分材料生长的关键设备。反应腔最高工艺温度可达 1400 度，单炉可生长 18 片 2 英寸外延晶片，并可延伸到生长 4 英寸晶片。

中微 Prismo HiT3® MOCVD 设备专为深紫外 LED 量产而设计，是目前业内极具竞争力的紫外 LED 高温 MOCVD 设备。

The Prismo HiT3® MOCVD system is engineered to grow high-quality aluminum nitride and high-aluminum composition materials. With a maximum reactor temperature of 1400°C, the Prismo HiT3 MOCVD system can process up to 18x2" epitaxial wafers per run, with extendibility to 4" wafers.

Prismo HiT3® is designed for deep UV LED mass production with major competitive advantages in the industry.

Product Features
产品特点

- 适用于高温氮化铝材料和深紫外LED生长的关键设备
- 优异均匀性和高效能相结合
- 适合高晶体质量和高AIN生长速率的新颖腔体设计
- 创新的实时监控系统
- 工艺温度最高可达1400度，具有优异的温场均匀性和控制稳定性
- 具有高稳定性、自动化的真空传送系统，抑制颗粒的产生
- 界面友好、全自动化的操作系统

- Enabling growth of high temperature AIN material and UVC LEDs
- Excellent epi yield, with industry-leading efficiency and uniformity
- Novel chamber features for high quality growth and high AlN growth rate
- Innovative in-situ, real-time monitoring system
- Process temperature up to 1400°C process with excellent temperature uniformity and stability
- Highly stable automatic vacuum transfer to minimize particle generation
- Fully automated operation system with user-friendly interface

Competitive Advantages
竞争优势

- 优异的工艺重复性，简化工艺调整需求，提高产品良率
- 单炉可生长18片2英寸外延晶片，具有较低的生产成本
- 集成顶盖升降机构，简化设备维护，提高设备利用率
- 业界领先的UVC LED产能及维护周期

- Superb process performance, simplified process adjustment and improved production yield
- Up to 18x2" epitaxial wafers per run with low production cost
- Integrated lid lifting mechanism, simplified tool maintenance and improved equipment utilization
- Superior UVC LED wafer capacity and long PM cycle

为高端显示应用所需的Mini LED大规模生产提供的MOCVD外延解决方案
MOCVD solution for advanced display application with high-volume Mini LED production

PRISMO UniMax™

中微具有自主知识产权的Prismo UniMax™ MOCVD设备可配置多达4个反应腔,可同时加工108片4英寸或40片6英寸高性能氮化镓基蓝绿光Mini LED外延晶片，通过石墨盘的调整，可扩展至同时加工164片4英寸或72片6英寸外延晶片，其工艺能力还可延展到生长8英寸外延晶片。每个反应腔都可以独立控制，这一创新设计具备卓越的生产灵活性。中微Prismo UniMax™ MOCVD设备配置了新颖的局部温度补偿加热系统，专为高性能Mini LED量产而设计，具备优异的产出波长均匀性及产出稳定性。此外，Prismo UniMax™ MOCVD设备配置了785mm大直径石墨托盘，极大地提高了设备产能，并有效地降低了Mini LED外延片的生产成本。

With its patented architecture, the Prismo UniMax™ MOCVD system can accommodate up to 4 reactors and process up to 108x4” or 40x6” GaN based Blue/Green Mini LED wafers simultaneously. It is extendible to process 164x4” or 72x6” wafers through susceptor configuration change, and is also capable for 8” wafer processing. Each reactor is controlled independently – a novel design that enables exceptional manufacturing flexibility. The Prismo UniMax™ MOCVD system is engineered for high performance Mini LED production with its innovated local temperature adjustable heating system. It can deliver excellent wavelength uniformity and good reliability for Mini LED production. With its 785mm diameter susceptor, the Prismo UniMax MOCVD system can significantly improve the production throughput and reduce the cost of ownership.

Product Features
产品特点

- 自主的实时监控系统
- 精准的参数控制
- 自动化的控制与维护功能
- 符合半导体标准的软件控制系统

- Industry advanced in-situ, real-time monitoring system
- Precise process parameters control
- Automated and programmable maintenance routines
- SEMI S2 certified with enhanced tool safety performance

Competitive Advantages
竞争优势

- 可独立控制的反应腔运行模式
- 新颖的局部温度调控加热系统
- 优异的LED波长均匀性

- Independently controllable reactors
- Novel local temperature adjustable heating system
- Excellent LED wavelength uniformity

工业用大型VOC净化设备　VOC purifier for industrial use

VOC净化设备

中微利用分子筛的吸附原理的化学反应器，在国内率先开发制造了工业用大型VOC净化设备。设备采用机电一体化、半导体等级的人机防护，具有独特的在线浓度监测功能，能远程实时管理和智能控制，并可根据客户的要求灵活配置不同处理规模的系统，提供给客户可靠、稳定、安全和节能的VOC解决方案。目前，中微的VOC净化设备已被广泛应用于国内平板显示行业生产线，以改善洁净室的工作环境。

AMEC pioneered the first Volatile Organic Compounds (VOC) purifier developed in China and targeted for industrial use. The product features an integrated electronic cabinet and a design that meets stringent SEMI safety standards. A unique in-situ VOC monitoring function enables remote real-time monitoring and smart control. The tool, which can be customized and scaled to address diverse treatment capacity needs, offers a stable, reliable, safe and energy-efficient VOC removal solution. The product is widely used in LCD production lines in China to improve clean room environments.

Product Features
产品特点

- 与其他同类产品相比，占地面积小、功耗低
- 整合式电气控制柜设计，简化配线和设备布局
- 复合式处理风机设计，保证设备持续高效运行
- 安全设计符合IEC及相关的标准

- Compact footprint
- Integrated electronic cabinet and simplified system layout
- Composite design for process fans to ensure continuous, efficient operation and generate maximum energy savings
- Complies with IEC safety requirements and associated standards

Competitive Advantages
竞争优势

- 拥有多项专利的VOC浓度在线监测系统
- 多种针对不同VOC环境下的经济运行模式，实现高效运营目的
- 高效的处理能力和低成本的维护投入
- 可根据客户需求，提供定制化的产品
- 专业的信息化模拟团队，为客户提供多种参数模型设计

- Patented in-situ VOC monitoring functions
- Multiple smart-control modes for optimum energy savings
- High VOC removal efficiency with lower maintenance requirements
- Can be customized and scaled to address diverse treatment capacity needs
- Multiple parameter model design engineered by professional CFD team

零缺陷的质量管理和安全生产　Zero-defect quality management and safe production

高效营运缩短中间环节，保障及时供货
质量控制和保障落实到每个生产环节和个人
在保障环境和人员安全的前提下安全生产

Efficient manufacturing operations with optimized processing steps that ensure timely supply of parts
Implementation of quality control and assurance in each production step
Safe and secure production environment

AMEC ranks among top performers in 2018 & 2019 VLSI customer satisfaction survey
中微公司在美国VLSI Research 2018和2019年全球客户满意度评比中连续排名前列

全球晶圆制造设备供应商排名第三
芯片制造专用设备供应商排名第二
薄膜沉积设备供应商排名第一

3rd place in THE BEST Suppliers of Fab Equipment
2nd place in the 10 BEST Focused Suppliers of Chip Making Equipment
1st place in Deposition Equipment Suppliers

全球晶圆制造设备供应商排名第三
芯片制造专用设备供应商排名第二
刻蚀和清洗设备供应商排名第二
薄膜沉积设备供应商排名第一

3rd place in THE BEST Suppliers of Fab Equipment
2nd place in the 10 BEST Focused Suppliers of Chip Making Equipment
2nd place in the Etch & Clean Equipment Suppliers
1st place in Deposition Equipment Suppliers

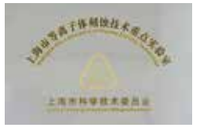
AMEC is one of 5 semiconductor equipment companies that earned 5 VLSI Star Ratings
中微公司是五家被评为五星级的半导体设备公司之一

国家企业技术中心
National Enterprise Technology Center

国家发改委、科技部、财政部等部门 2020年12月

2020福布斯中国最具创新力企业50强
2020 Forbes China 50 Most Innovative Companies

福布斯中国 2020年10月



上海市等离子体刻蚀技术重点实验室
Shanghai Key Laboratory of Plasma Etching Technology

上海市科学技术委员会 2019年12月

制造业单项冠军产品（中微28/22/14/7纳米刻蚀机系列）
Champion Product in Manufacturing Industry

工业和信息化部、中国工业经济联合会 2019年11月

2017年度突出贡献奖
Outstanding Achievement Award 2017

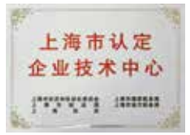
全国半导体设备和材料标准化技术委员会 2017年11月

SAP HANA创新奖
SAP HANA Innovation Award Winner 2017

SAP 2017年5月

上海市科技小巨人企业
Shanghai Little Giant Enterprise of Science and Technology

上海市科学技术委员会、上海市经济和信息化委员会 2016年6月



上海市认定企业技术中心
Certificated Enterprise Technology Center of Shanghai

上海市经济和信息化委员会、上海市财政局等 2016年2月

第十六届中国国际工业博览会金奖
Gold Prize awarded by the 16th Session China International Industry Fair

中国国际工业博览会组委会 2014年11月

第十五届中国国际工业博览会银奖
Silver Prize awarded by the 15th Session China International Industry Fair

中国国际工业博览会组委会 2013年11月

第十五届中国专利金奖
Chinese Patent Gold Prize in the 15th China Patent Award Selection

国家知识产权局 2013年11月

2011年度上海市科学技术进步奖二等奖
2nd Prize - Shanghai Science and Technology Progress Award

上海市人民政府 2011年11月

2009年度上海市科学技术进步奖一等奖
1st Prize - Shanghai Science and Technology Progress Award

上海市人民政府 2010年3月

2009年度最佳产品奖
Best Product Award 2009

美国《半导体国际》杂志 2009年7月