High tech industry contamination measuring analysis leading company, IVT Co., Ltd.

尖端产业污染测量分析领头企业(株)IVT

ivt

KRISS Korea Research Institute of Standards and Science

No. 1 technical innovation leading company

技术革新领头1号企业

Company Introduction

ivt

Infinity Vacuum Technology

We build world best technical skills in vacuum technologies.

We supply cutting edge products such as vacuum devices, testing devices, precision components and so on related with semiconductor and display manufacturing since its establishment in 2008. Currently, vacuum technology becomes core cutting edge industrial basic technology over various industrial areas such as space engineering, biotechnology, material engineering, chemical engineering and so on. As such, we manufacture and supply various products from small size devices for research to large scaled devices for manufacturing such as R&D vacuum devices, semiconductor testing devices, manufacturing display process devices, semiconductor furnaces, chemical application valves and so on.

We have been accumulating various manufacturing experience and knowhow for precision components and cutting edge vacuum devices manufacturing technologies and so on by the joint project with companies, universities and R&D centers, and especially, continuous intangible value increasing rate will be correspondingly because there is technical support from Semiconductor Measuring Device Team in Korea Research Institute of Standards and Science.

We promise we will be a major partner reliable for the customers with our best effort to supply best products by continuous quality improvement and technical innovation based on constant effort and passion with young and experienced talented people having the capacity and dynamism in the future. Also, we promise we will do our best for localization project for materials, parts and devices as a cooperative partner for national cutting edge industrial companies and government contribution R&D center of major semiconductor, display and so on such as Samsung Electronics, Korea Research Institute of Standards and Science, National Fusion Research Institute and so on.

CEO ***Jo Yong Dae***

创造真空领域世界最佳技术。

本公司成立于2008年，专业提供半导体及显示器制造相关的真空设备、检测设备、精密元件等尖端产品。

近年来，真空技术已成为航天工程、生物技术、材料工程和化学工程等多个工业领域的核心、尖端产业基础技术。因此，本公司为了满足顾客的各种需求，生产制作以及提供研究用真空设备、半导体检测设备、生产用显示工艺装置、半导体用流量计、化学用阀门等用于研究的小型设备到用于生产的大型设备。

多年来，通过与企业、大学、研究所合作开展项目，积累了精密零件制作及先进真空设备制作技术等各种制造经验及秘诀。尤其是获得韩国标准科学研究院半导体测量设备组的技术支持，无形价值增长率相对较高。

未来，我们将与富有实力和朝气的年轻且熟练的人才一起，以不懈的努力和热情，不断提高质量和创新技术，承诺提供最优质的产品，成为各位值得信赖的合作伙伴。此外，作为三星电子、韩国标准科学研究院、国家核聚变研究所等主要半导体、显示器等国家尖端产业企业及政府出资研究机构的合作企业，我们承诺全力做好材料、零部件、设备国产化开发事业。

CEO ***Jo Yong Dae***

The Application of TDS

Semiconductor 半导体	Samsung 16L Analysis Laboratory, Samsung Semiconductor R&D Center, SCS, PSK, Eugene Materials **Epitaxial Wafer, Carbon Wafer, Cleaning and before & after HMDS**
Metal / Steel 金属 / 钢铁	Hyundai Steel, POSCO, Daewoo Shipbuilding and Marine Engineering, Samsung SDI, Haesung DS, Applied Materials Korea and so on **Stainless steel, mild steel, 9% nickel steel, manganese alloy steel, copper alloy and so on**
Display 显示	Samsung Display, LG Display, Hanyang University, Dow Chemical, Duksan Neolux, Dongwoo Fine-chem **Organic thin film on glass, Polyimide and so on**
High Polymers 高分子	Applied Material Kora, Dupont Korea, Samsung Electro-Mechanics, Samgyeong ENG, KST, 2WINTEK, Amkor Technology Korea **Silicon, FKM, FFKM and so on**

History

2020 07	Designated as Promising Export Enterprise by the SMEs and Startups Administration
06	Certified as Material & Parts Specialized Company by the Korea Evaluation Institute of Industrial Technology
05	Designated as Home Doctor Company by the Korea Research Institute of Standards and Science
2019 07	Developed hydrogen embrittlement pollution measuring analysis technology, fTDS / sTDS ver 2.0
2018 11	Received KOSHA 18001 certificate by Korea Occupational Safety and Health Agency
10	Received occupational safety and management system K-OHSMS / OHSAS 18001 certificate
02	Selected as No. 1 Technical Innovation Leading Company by Korea Research Institute of Standards and Science (KRISS)
01	Developed advancement technology of complex heating TDSs (SRM in distance, sample in large chamber TDS)
2017 12	Awarded grand prize at the 17th Daegu - Gyeongbuk Cutting Edge Venture Industry Awards - Minister Commendation from the Ministry of SMEs and Startups
09	Awarded Presidential citation at the 18th Small and Medium Sized Enterprise Technical Innovation Fair
07	Selected as superior success case for Small and Medium Sized Enterprise Technical Development Support Project (For three consecutive years)
04	Registered patent of lithium ceramic pebble production device for nuclear fusion reactor (No. 10-1727536)
2016 10	Developed Ø 25 mm sample analysis technology, Small TDS
2014 05	Developed 300 mm wafer qualitative + quantitative analysis technology, Fusion TDS
03	Awarded exemplary taxpayer
01	Selected as family company of National Fusion Research Institute
2013 05	Developed 300 mm wafer qualitative analysis technology, Auto TDS
03	Selected as family company of Korea Research Institute of Standards and Science (KRISS)
2012 06	Developed heating mapping technology for high-degree vacuum-based wafer impurity test
2011 11	R&D device using technical development project (Diaphragm vacuum pump)
10	Certified as INNO-BIZ company
2010 12	Received company R&D center certificate
2009 06	Certified as part & material specialized company
2008 12	Certified as venture company
08	Established IVT Co., Ltd.

2020 07	中小风险企业厅指定出口有望企业
06	韩国产业技术评价院材料配件专业企业认证
05	韩国标准科学研究院指定家庭医生企业
2019 07	开发氢臭污染测定分析技术 fTDS / sTDS ver 2.0
2018 11	韩国产业安全保健工团 KOSHA 18001认证
10	安全保健管理体系 K-OHSMS / OHSAS 18001认证
02	当选第1号韩国标准科学研究院技术创新领军企业
01	开发复合升温TDSs先进化技术 (SRM in distance，sample in large chamber TDS)
2017 12	第17届大邱庆北高科技创意产业大奖 - 中小企业部长官表彰
09	第18届中小企业技术创新大展 - 总统表彰
07	当选中小企业技术开发支援事业优秀成功事例 (3年连续)
04	核聚变炉用锂陶瓷球制造装置注册专利 (第10-1727536号)
2016 10	开发Ø 25 mm sample 分析技术 Small TDS
2014 05	开发300 mm wafer 定性+定量分析技术 Fusion TDS
03	荣获模范纳税人
01	当选国家核聚变研究所家族企业
2013 05	开发300 mm wafer 定性 + 定量分析技术 Auto TDS
03	当选韩国标准科学研究院家族企业
2012 06	开发基于高真空晶片杂质检测的升温映射技术
2011 11	研究设备活用技术开发项目 (薄膜真空泵)
10	技术创新型中小企业 (INNO-BIZ) 认证
2010 12	企业附设研究所认证
2009 06	零部件材料专业企业认证
2008 12	风险企业认证
08	成立(株)IVT

TDS (Thermal Desorption Spectroscopy)

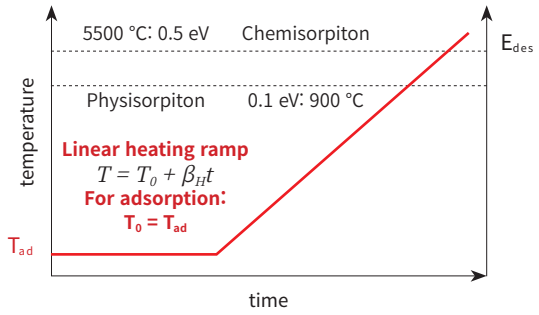
Thermal Desorption Spectroscopy (TDS) is a device to measure and analyze desorbed gas from the surface of the sample by heating the temperature of the sample. It can take precise information about the binding energy of each molecule. It is possible to check the change and composition of the gas in ultra - high vacuum area until trace amount and to measure the change according to the temperature and time as qualitative and quantitative. The sensitivity is best in analysis technology and superior in safety because it is chemical free.

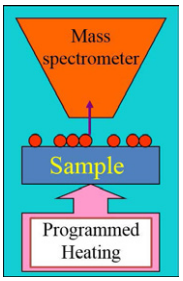
Impurities (Outgassing rate) test method according to the heating is generally performed with TDS method, but local and direction directive wafer real - time impurities mapping measuring diagnosis method is not defined globally until so far and the system possible to perform qualitative and quantitative analysis at the same time is nonexistent. We provide the TDS system overcoming these disadvantages.

Why TDS?

Simple Idea:

Adsorbed particles with different binding energies will desorb at different temperature.

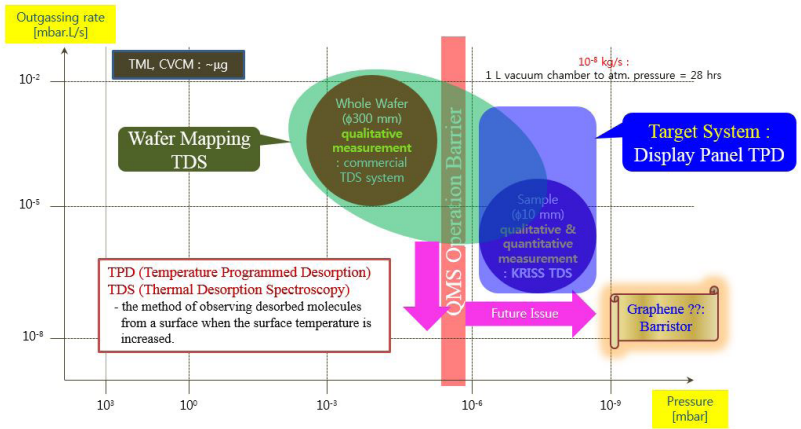


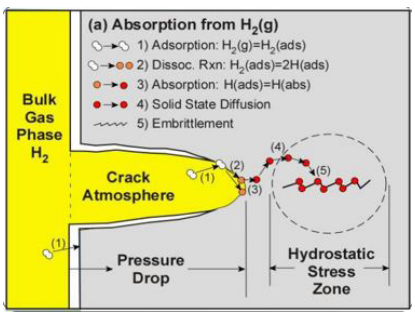


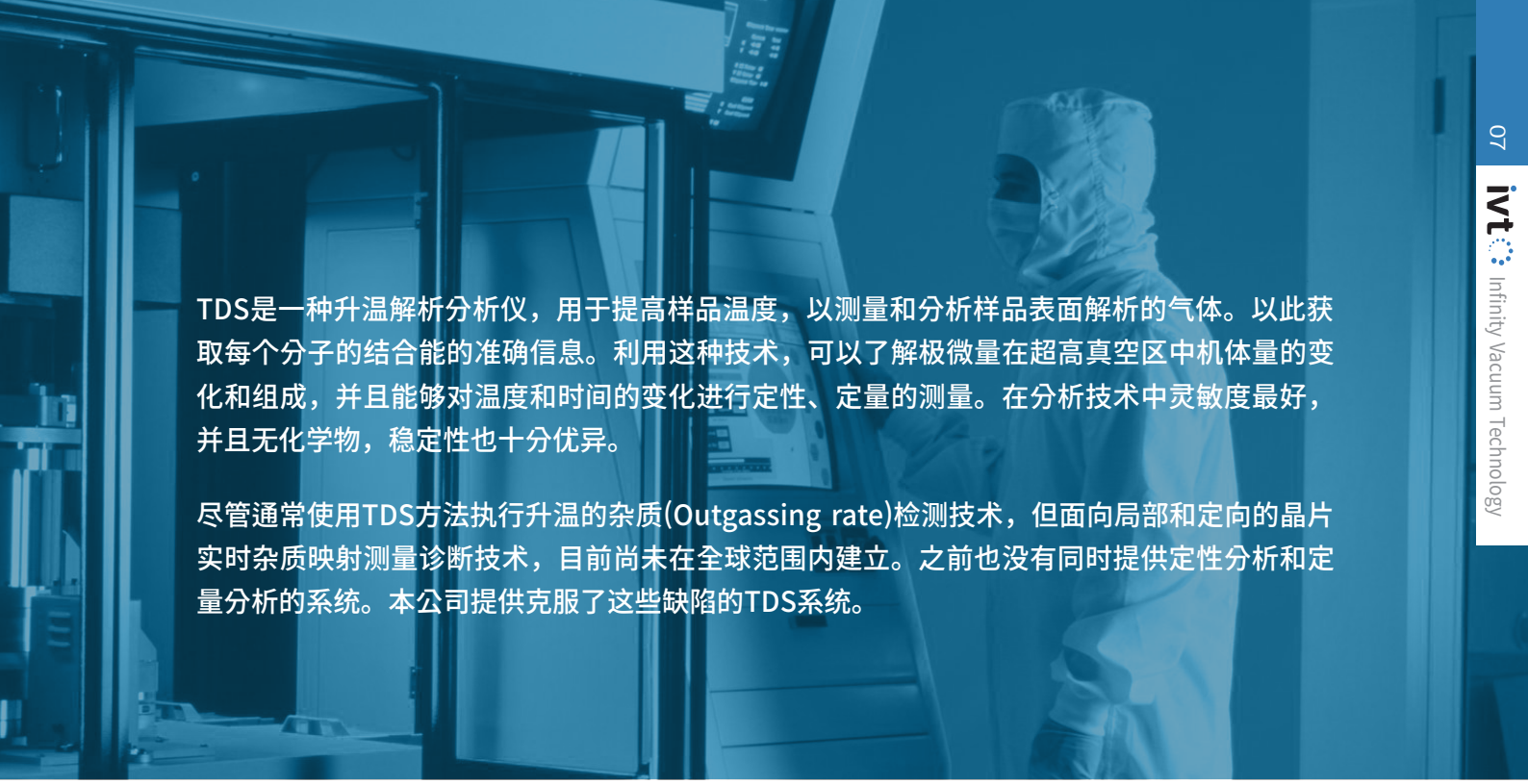
Applications

- Semiconductor and display material analysis
- Vehicle and steel material hydrogen analysis
- Ultrapure material and trace amount analysis

- 半导体、显示材料分析
- 汽车、钢铁材料氢分析
- 超纯材料、极微量分析

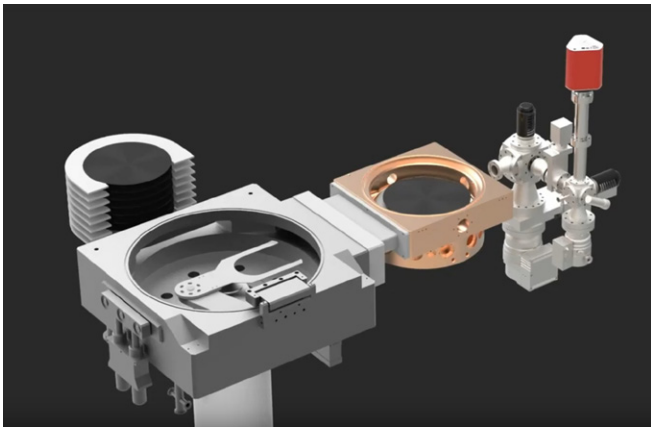




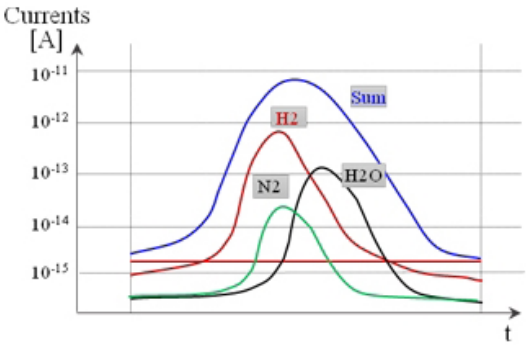


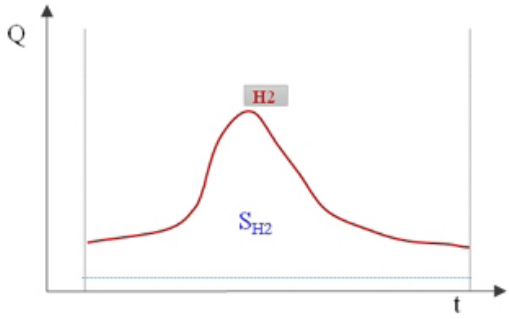
TDS是一种升温解析分析仪，用于提高样品温度，以测量和分析样品表面解析的气体。以此获取每个分子的结合能的准确信息。利用这种技术，可以了解极微量在超高真空区中机体量的变化和组成，并且能够对温度和时间的变化进行定性、定量的测量。在分析技术中灵敏度最好，并且无化学物，稳定性也十分优异。

尽管通常使用TDS方法执行升温的杂质(Outgassing rate)检测技术，但面向局部和定向的晶片实时杂质映射测量诊断技术，目前尚未在全球范围内建立。之前也没有同时提供定性分析和定量分析的系统。本公司提供克服了这些缺陷的TDS系统。

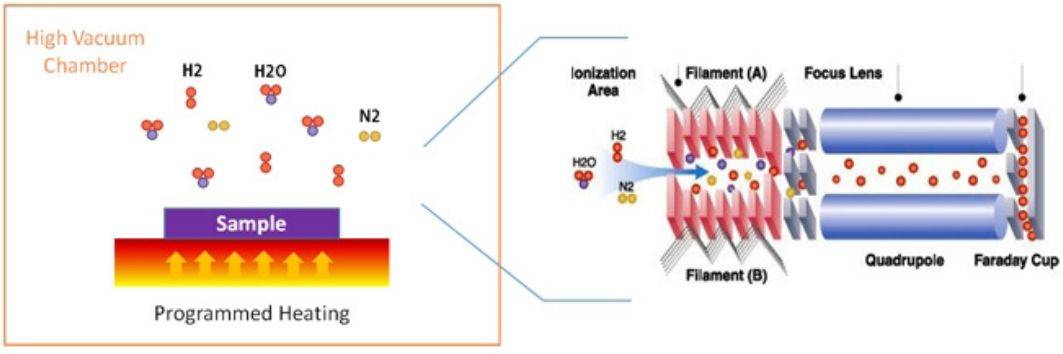


Quantitative Analysis





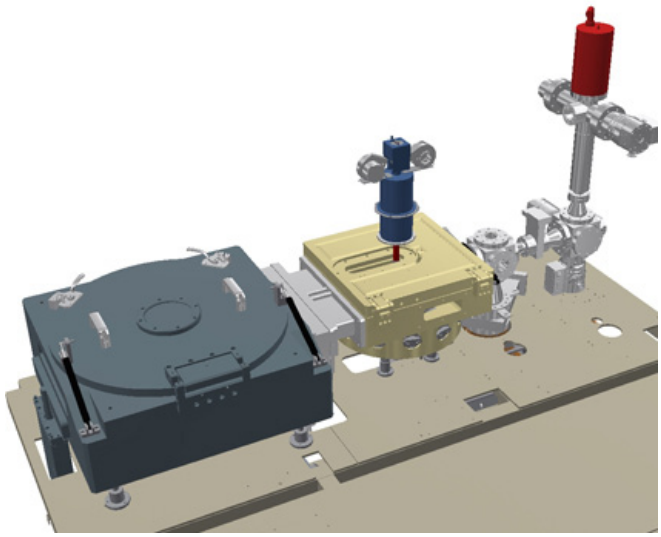
Quadrupole Mass Spectrometer



fTDS Thermal Desorption Spectroscopy for **Semiconductor Wafer**

Wafer real - time measuring diagnosis technology development is based on various academic foundation and highest level technology, and especially, it requires the integration of fusion technology and advanced cutting edge convergence technology such as advanced vacuum technology, impurities measuring diagnosis, extremely pure environment maintenance, process control, mapping and so on.

晶片实时测量诊断技术开发基于多种学术基础和极限技术，尤其要求实现了高难度的真空技术、杂质测量诊断、保持极净环境、过程控制、映射等融合技术的集约化和尖端化的先进复合技术。



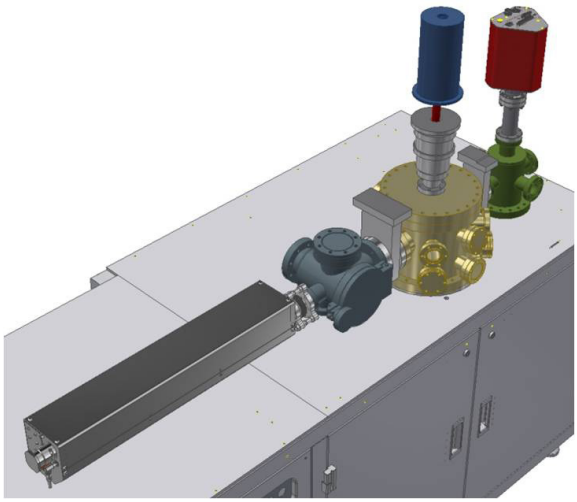
Specification

- Sample Description: ≤ Ø300 mm wafer
- Mass Range: (1 ~ 512) amu
- Full Heating: up to 950 °C
- Local Heating: up to 1,400 °C
- Base Pressure:
  - * process chamber, 5 × 10^{-7} mbar
  - * measurement chamber, < 5 × 10^{-9} mbar
- DAQ System: automated fully, wafer loading to measurement through data analysis

sTDS Thermal Desorption Spectroscopy for **Steel and materials of small samples**

Differentiated technology is required for qualitative and quantitative measuring analysis of hydrogen using vacuum technology at cutting edge process site including steel metal materials. It is appropriate for small samples under 20 mm × 20 mm × 3 mm, and it is possible to analyze under the environment such as high temperature range about 1,400 °C and extreme ultrahigh vacuum less than 5 × 10^{-10} mbar.

在包括钢铁金属材料的尖端工艺现场，利用真空技术进行氢气的定性+定量测量分析，需要差别化的技术。
适用于20 mm×20 mm×3 mm 以下的小型样品，可在1,400 °C 左右高温区域、
5 × 10^{-10} mbar 以下超高真空环境下进行分析。



Specification

- Sample Description: up to 20 mm × 20 mm × 3 mm
- Mass Range: (1 ~ 200) amu
- IR Rod Heating: up to 1,400 °C
- Base Pressure:
  * process chamber, < 2 × 10^{-9} mbar
  * measurement chamber, < 1 × 10^{-9} mbar
- DAQ System: manual or automated fully, sample loading to measurement through data analysis

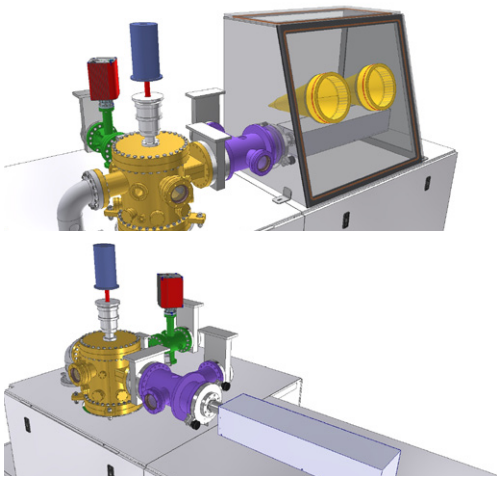
Applications

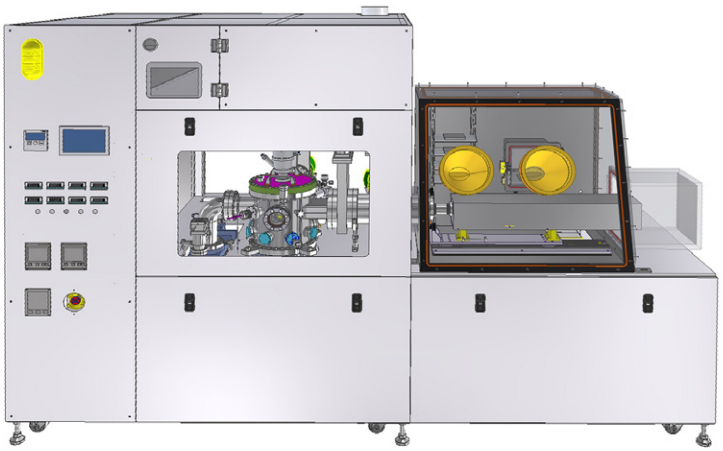
- Metallurgy
- Semiconductor
- Thin Film
- Glass
- Research & Development

dTDS Thermal Desorption Spectroscopy for **Display Material**

TDS for display can analyze organic thin-film with glass material and it is designed to hold and load the sample according to the form.

显示用TDS，可分析Glass材质上的有机薄膜等，在设计上可根据几何形状灵活安装和加载样品。





Specification

- Sample Description: glasses up to 100 mm × 100 mm
- Mass Range: (1 ~ 200) amu
- IR Heating: up to 900 °C
- Base Pressure:
  - * process chamber, < 5 × 10^{-7} mbar
  - * measurement chamber, < 1 × 10^{-9} mbar
- DAQ System: manual or automated fully, sample loading to measurement through data analysis

TDS Thermal Desorption Spectroscopy for **Special Application**

Outside of that, the TDS device manufacture for special purpose, it provides qualitative and quantitative analysis test report according to the analysis request from external institutions.

其他因特殊用途而制造的TDS设备，根据外部机构的分析委托，提供定性 + 定量分析的试验报告。

- Complex TDS
- SRM in distance, sample in large chamber TDS
- Varied sample features, user specified TDS in demand

Specification

Complex TDS

· Sample Description: up to Ø20 mm × 50 mm
· Mass Range: (1 ~ 200) amu
· IR Rod Heating: up to 800 °C
· Base Pressure:
  * process chamber, < 5 × 10^{-8} mbar
· DAQ System: manual, sample loading to measurement through data analysis

Specification

User defined TDS

· Sample Description: up to Ø30 mm × 50 mm
· Mass Range: (1 ~ 200) amu
· IR Heating: up to 900 °C
· Base Pressure:
  * process chamber, < 2 × 10^{-9} mbar
  * measurement chamber, < 1 × 10^{-9} mbar
· DAQ System: manual, sample loading to measurement through data analysis
· System Design: user specified requirements

Sample Data - NIST SRM

sTDS Calibration : NIST SRM 2453a

Fig. 0

Fig. 1

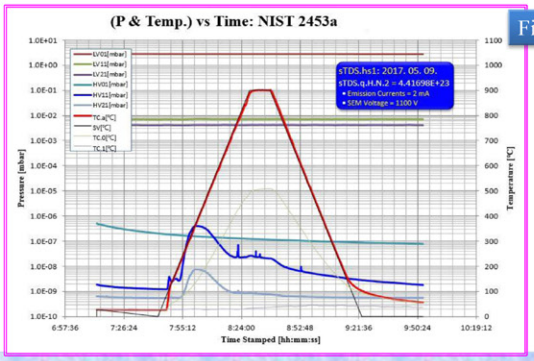


Fig. 2

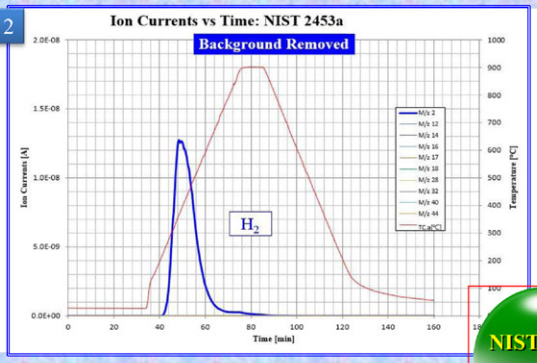
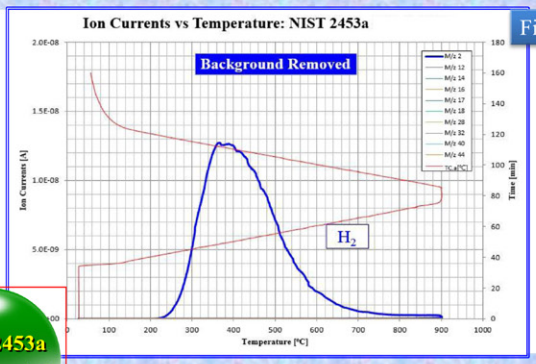


Fig. 3



NIST 2453a
Method 2

Fig. 4

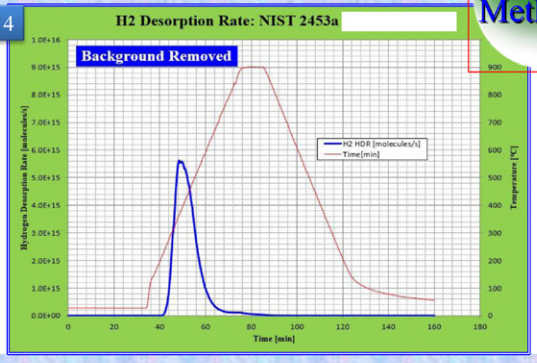


Fig. 5

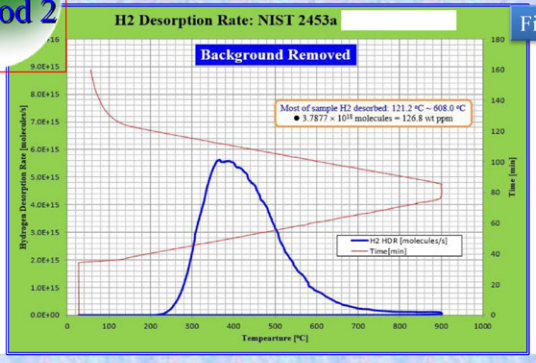


Fig. 6

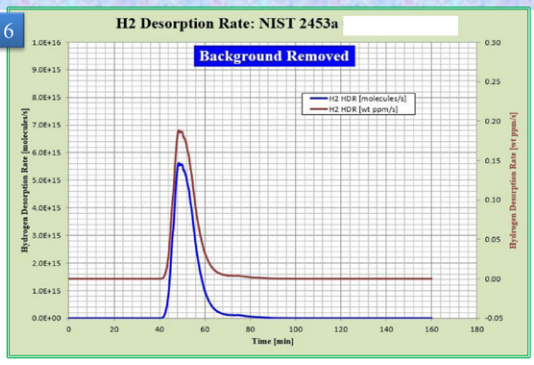
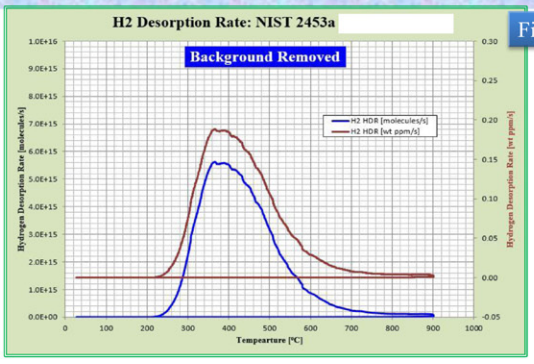


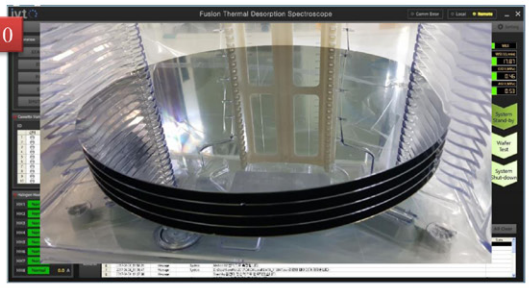
Fig. 7



Sample Data - wafer sample

fTDS Analysis : Wafer Sample

Fig. 0



fTDS Specification:

1. Designed for Impurity Detection on 300 mm Wafer
2. Sample Heating Modes; beam heater & lamp heaters
3. Self-calibration Function
   - System Calibration Factor, R, determined every six months
   - factor R experimentally set between method 1 & method 2
   - currently R = 9.18
   - method 1; pumping speed not enough, calibration only
   - method 2; default DAQ setting
4. Loadlock System for Sample Loading
5. Fully Automated with Mapping Function
6. QMS
   - 10 masses selected in DAQ
   - M/z outgassing rate: total outgassing rate × ratio of M/z currents versus currents sum, Σ (1 amu ~ 200 amu)

Fig. 1

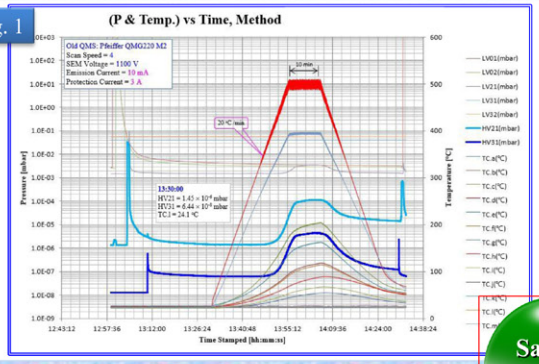
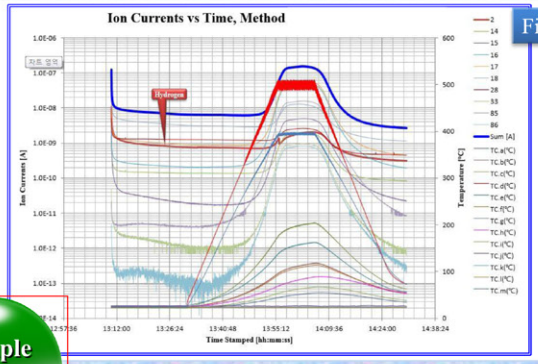


Fig. 2



Sample Method

Fig. 3

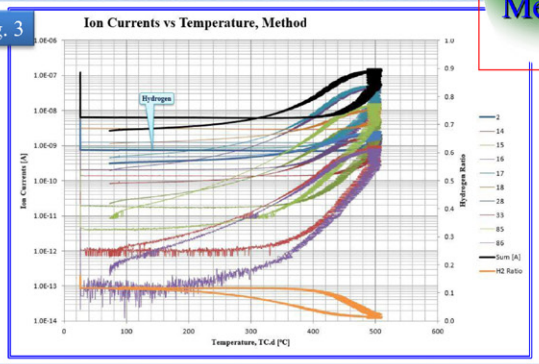


Fig. 4

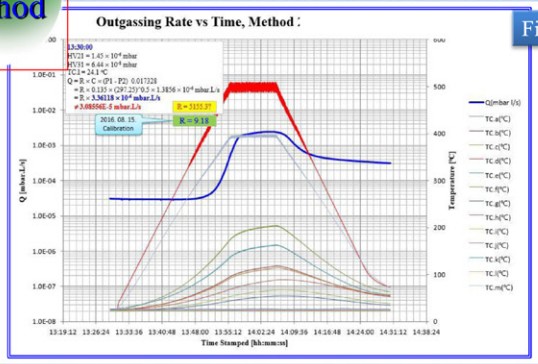


Fig. X

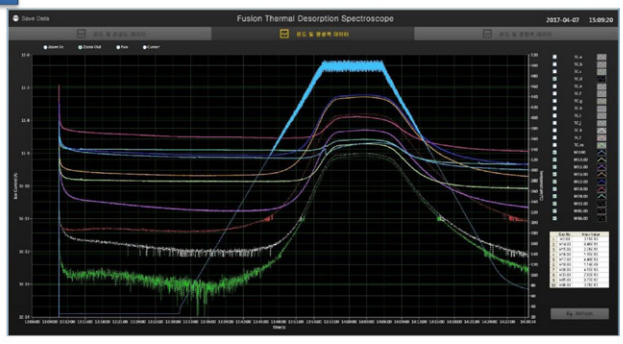
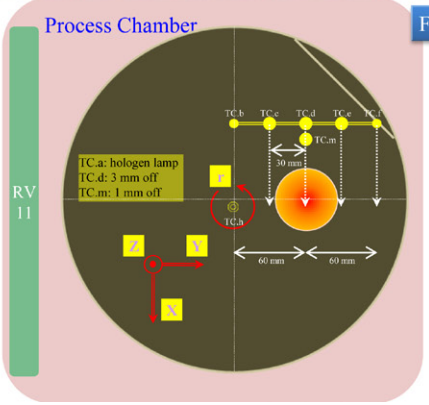


Fig. Y



Sample Data - display sample

sTDS Analysis : SiO_2

Fig. 1

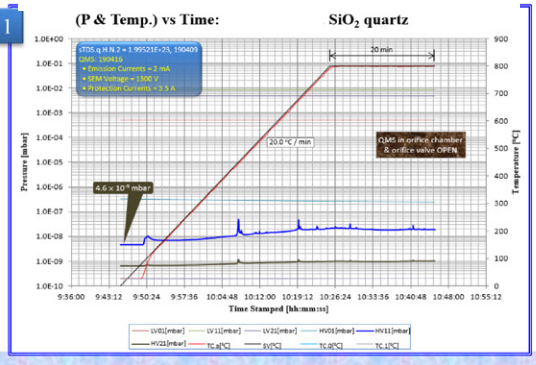
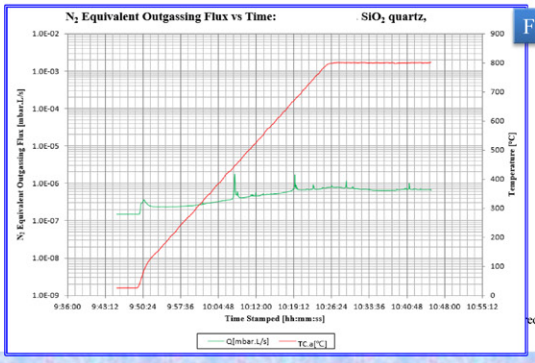


Fig. 2



equired

Fig. 3

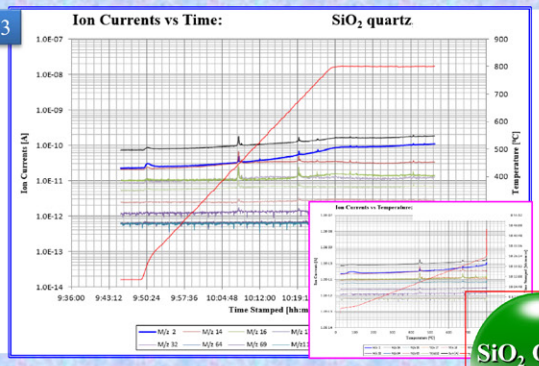
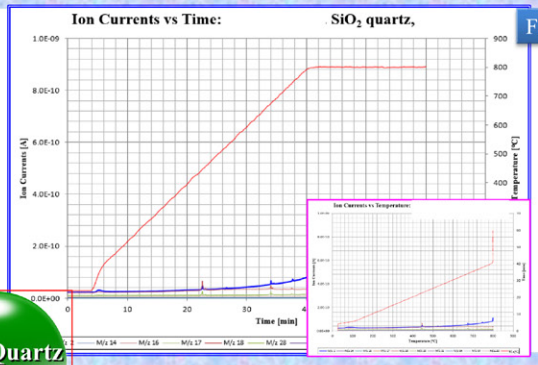


Fig. 4



SiO_2 Quartz

Fig. 5

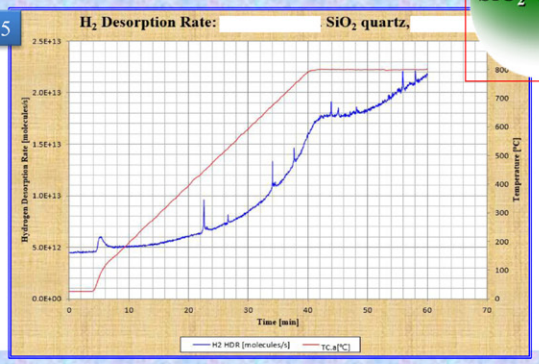


Fig. 6

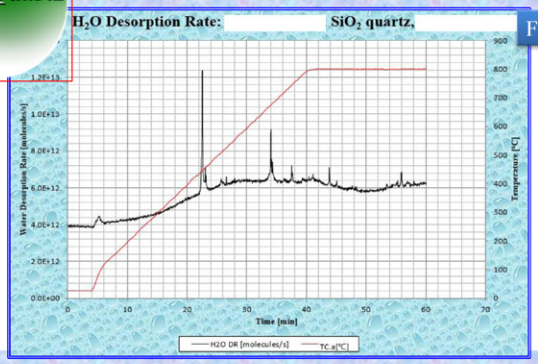


Fig. 7

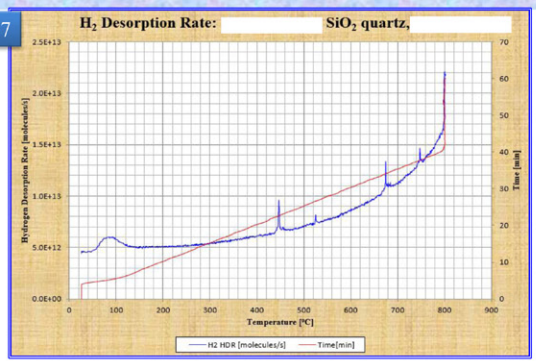
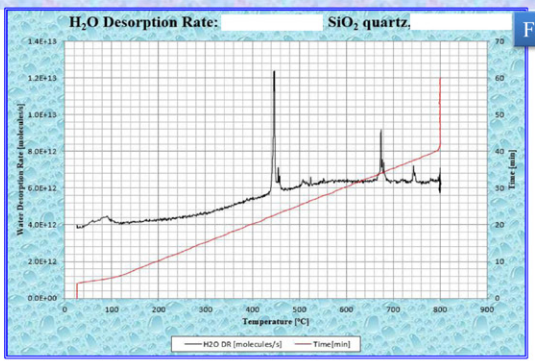


Fig. 8



Sample Data - steel sample

sTDS Analysis : SUS

sTDS.ivt Specification:

1. Designed for Impurity Detection of ϕ25 mm Samples
2. Sample Heating: IR rod heater, 1200 °C
3. Equipped with Self-calibration Function
   - System Calibration Factor, R, determined every six months
   - factor R experimentally set between method 1 & method 2
   - currently R = 16.00
   - method 1; calibration, *J. Vac. Sci. Technol. A 20(5), Sep/Oct 2002*
   - method 2; default DAQ setting
   - sTDS.q.H.N.2: traceable with certified NIST SRMs
   - sTDS.q.H_2O.2 = 1.00E20, arbitrary
4. Loadlock System for Sample Loading
5. GUI DAQ
   - 200 masses/s scanned with LabVIEW DAQ system
   - Capable of qualitative and quantitative H_2 measurement of less than 1 ×10 $^{-5}$ wt ppm

Fig. 1

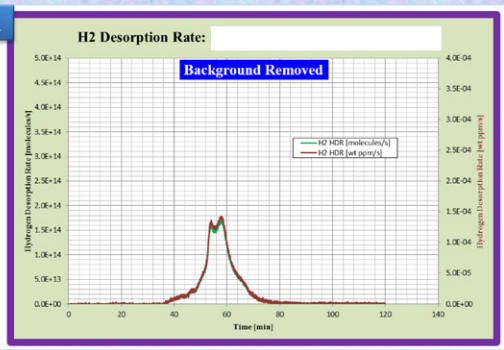


Fig. 2

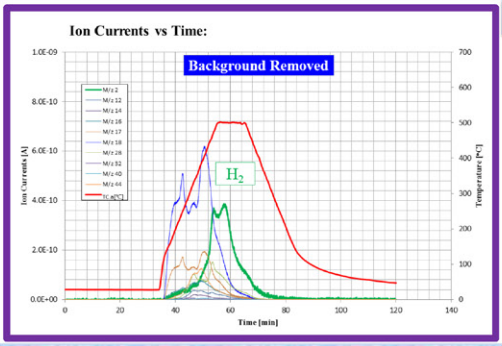


Fig. 3

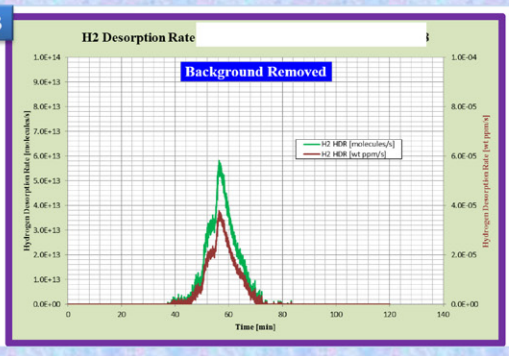


Fig. 4

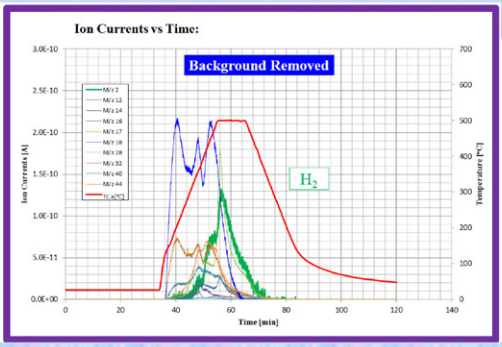


Fig. 5

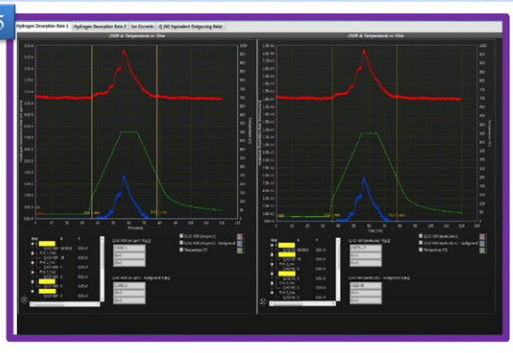
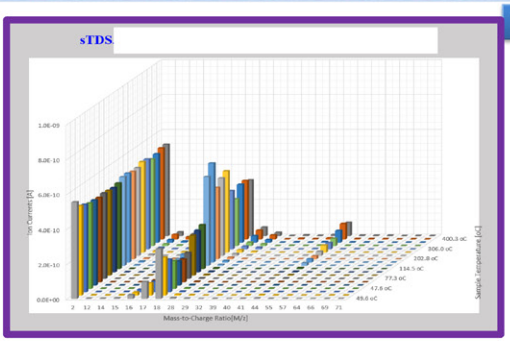


Fig. 6



Test report

INFINITY VACUUM TECHNOLOGY
IVT Co., Ltd. 109, Geomdan Tech part, 887-62, Geomdan-dong, Buk-gu, Daegu, Republic of Korea (☎ 82-53-354-2939)

시험번호 (Test ID):

시험성적서
TEST REPORT

의뢰기관 (Applicant):
- 주소 (Address):

시험대상 (Sample): 300 mm wafers
- 제작회사 및 형식 (Manufacturer & Model):
- 시료번호 (Sample No): NA

접수일자 (Date of Receipt):
시험일자 (Evaluation Dates):

시험내용 (Description of Test)
- 시험명 (Test Objective): 제공된 시료의 승온에 따른 outgassing measurement (qualitative & quantitative)
- 시험장소 (Test Site): ☑ IVT 실험실 (Lab) ☐ 현장 (On-site)
- 시험환경 (Environmental Condition)
  * 온도 (Temperature): (24 ± 1) ℃ * 상대습도 (Relative Humidity): (30 ± 10) % RH
- Pre-conditions: stored in the cleanroom as-received
- 시험방법 (Test Method)
  * 다음 쪽 "시험결과" 참조 (next page)
- 시험결과 (Test Results)
  * 다음 쪽 "시험결과" 참조 (next page)
- 측정장비 (Test Apparatus)
  * ☐ sTDS.ivt: ϕ 25 mm sample
    - *QMS sensitivity checked with a standard substance (air or calibration gas)*
    - *system calibrated with NIST SRM 2453a (1.34 % uncertainty, 95 % coverage interval)*
    - *quantitative measurement resolution: 1.3E-6 wt ppm (hydrogen)*
    - *measurement uncertainty (throughput method): 18 %, 95 % coverage interval*
  * ☑ fTDS.ivt: ϕ 300 mm wafers
    - QMS sensitivity checked with a standard substance (air or calibration gas)
    - system calibrated with NIST SRM 2453a (1.34 % uncertainty, 95 % coverage interval)
    - quantitative measurement resolution: 1.3E-6 wt ppm (hydrogen)
    - measurement uncertainty (throughput method): 18 %, 95 % coverage interval
- Post-conditions: stored in the cleanroom
  - 반출 조건: 시험 후 IVT 보관

☐ 담당자 (Executed by): 오현석 *(H. S. Oh)* 053-354-2939 hs.oh@ivt4u.com

☐ 기획자 (Designed by): 김경동 *(G. D. Kim)* 053-354-2939 gdkim@ivt4u.com

☐ 책임자 (Approved by): 임철환 *(C. H. Lim)* 053-354-2939 master@ivt4u.com

ivt

DD - MM - YYYY
㈜아이브이티 대표이사
President, IVT Co., Ltd. [인]

IVT TEST RESULTS TEST ID:

ivt 주식회사 아이브이티
41514 대구광역시 북구 검단공단로 206(검단동)검단테크파트 109호
TEL : (053) 354-2939 / FAX : (053) 354-2930 / http://www.ivtkr.com

분 석 의 뢰 서

신청기관	소속사		전화번호	
	사업자등록번호		e-mail	
	주 소			
	부서 및 직위		성 명	
분석 의뢰 명				

1. 분석목적

2. 분석의뢰 정보

시료 크기	시료크기(가로×세로×높이) 또는 ⌀ mm	시료 갯수	
예상 outgas		요청 outgas	

3. 희망 recipe

최대온도		측정 유지온도	측정 유지시간

▶ 기타 시료에대한 상세한 내용과 요청정보 부탁드립니다.
▶ 시료제공시 Bare sample를 제공해주셔야 정확한 측정이 가능합니다.
▶ 샘플이 2개이상인 경우 아래에 서술형식으로 recipe 요약부탁드립니다.

분석 요청일		결과물 등 접수방법	접수 : master@ivt4u.com 결과 : 분석 Report 제공

IVT TEST RESULTS TEST ID:

Summary

Hydrogen (H_2) Quantity Evolved*

Sample ID		Temperature [℃]	Time [min]	Σ(ΔQ) (wt ppm)	Σ(ΔQ) [molecules]	Re-marks
reference wafer #2	section 1	333.4	76.0	9.5469E-03	3.6207E+17	
	section 1	797.2	100.0			
	section 2	797.2	100.0	1.3951E-02	5.2908E+17	
	section 2	413.4	137.1			
epitaxial Ge layer #2	section 1	96.9	64.0	5.8570E-02	2.2291E+18	
	section 1	409.9	80.0			
	section 2	409.9	80.0	1.8568E-01	7.0667E+18	
	section 2	871.8	106.3			
HMDS priming #2	section 1	332.7	76.0	6.7512E-03	2.5628E+17	
	section 1	801.2	100.0			
10 nm DCVD SiO_2 #2	section 1	333.9	76.0	8.4221E-03	3.1966E+17	
	section 1	799.3	100.0			
	section 2	799.3	100.0	6.9771E-03	2.6481E+17	
	section 2	717.4	108.0			
70 nm DCVD SiO_2 #2	section 1	332.9	76.0	1.9714E-01	7.4787E+18	
	section 1	717.1	108.0			

** fTDS system calibrated with NIST SRM 2453a (126.8 mg/kg, hydrogen in titanium alloy)*

Water (H_2O) Quantity Evolved*

Sample ID		Temperature [℃]	Time [min]	Σ(ΔQ) (wt ppm)	Σ(ΔQ) [molecules]	Re-marks
reference wafer #2	section 1	177.3	68.0	3.5618E+00	1.5112E+19	
	section 1	545.3	120.0			
	section 2	28.0	60.0	2.6708E+01	1.1372E+20	
epitaxial Ge layer #2	section 1	425.1	80.8			
	section 2	425.1	80.8	1.8422E+01	7.8439E+19	
	section 2	874.9	104.0			
HMDS priming #2	section 1	176.3	68.0	2.4512E+00	1.0410E+19	
	section 1	798.7	100.0			
10 nm DCVD SiO_2 #2	section 1	177.8	68.0	3.2166E+00	1.3659E+19	
	section 1	799.3	100.0			
70 nm DCVD SiO_2 #2	section 1	176.5	68.0	1.3530E+01	5.7425E+19	
	section 1	796.4	100.0			

◈ Universal Flow Balance Equation; differential pumping system in Fig. 1
V1·dP1/dt = Q − (C0 + S1)·P1 + C0·P2 ⇒ Q = (P1 − P2)·C0 + P1·S1
V2·dP2/dt = C0·P1 − (C0 + S2)·P2 ⇒ P2 = P1·C0/(C0 + S2)
⇒ *Q = R·C0·(P1 − P2); R: system calibration factor, experimentally determined*

◈ Conversion Factors
PV = nRT = Nk_BT
* n; number of moles, R; gas constant
R = 8.3144598 [J/(K·mol)], relative standard uncertainty of 5.7E-7
* R = N$_A$$k_B$
N$_A$: Avogadro constant, k_B *(k)*; Boltzmann constant
N$_A$ = 6.022E+23 [/mol]
k_B *(k)* = 1.381E-23 [J/K = Pa·m^3/K]
* N; particle count

Fig. 3-3. Qualitative analog scan: HMDS priming #1

Fig. 3-4. Qualitative analog scan: 10 nm DCVD SiO_2 #1

IVT TEST RESULTS TEST ID:

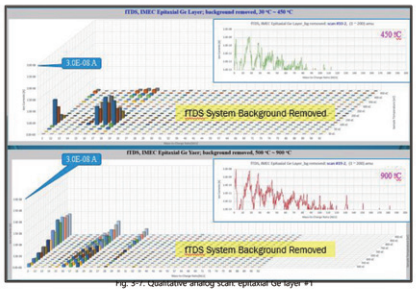


Fig. 3-7. Qualitative analog scan: epitaxial Ge layer #1

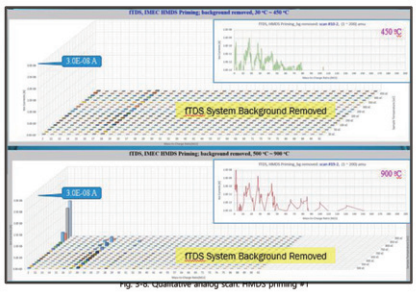


Fig. 3-8. Qualitative analog scan: HMDS priming #1

IVT TEST RESULTS TEST ID:

C. fTDS System Information in Whole Wafer Heating Mode: dedicated GUI DAQ

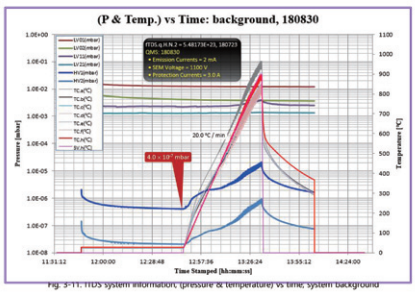


Fig. 3-11. fTDS system information, (pressure & temperature) vs time, system background

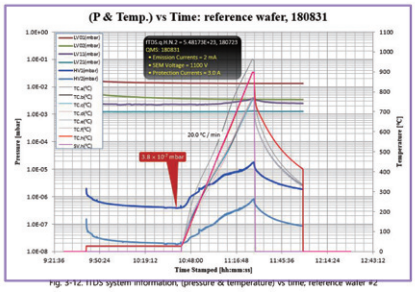


Fig. 3-12. fTDS system information, (pressure & temperature) vs time, reference wafer #2

IVT TEST RESULTS TEST ID:

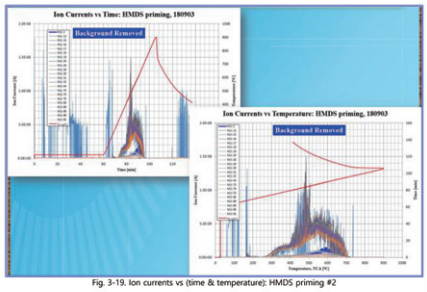


Fig. 3-19. Ion currents vs (time & temperature): HMDS priming #2

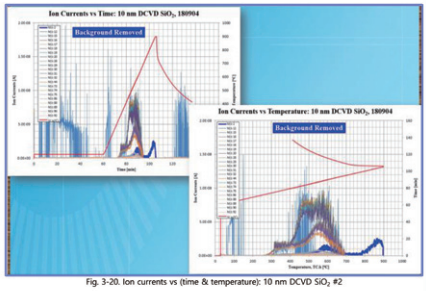


Fig. 3-20. Ion currents vs (time & temperature): 10 nm DCVD SiO_2 #2

IVT TEST RESULTS TEST ID:

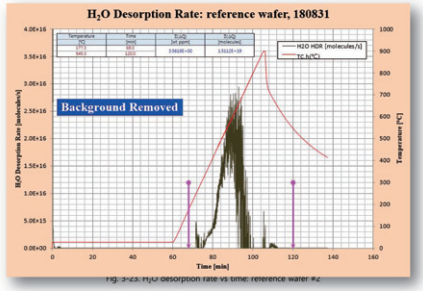


Fig. 3-23. H_2O desorption rate vs time: reference wafer #2

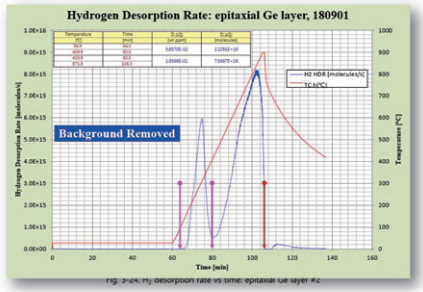
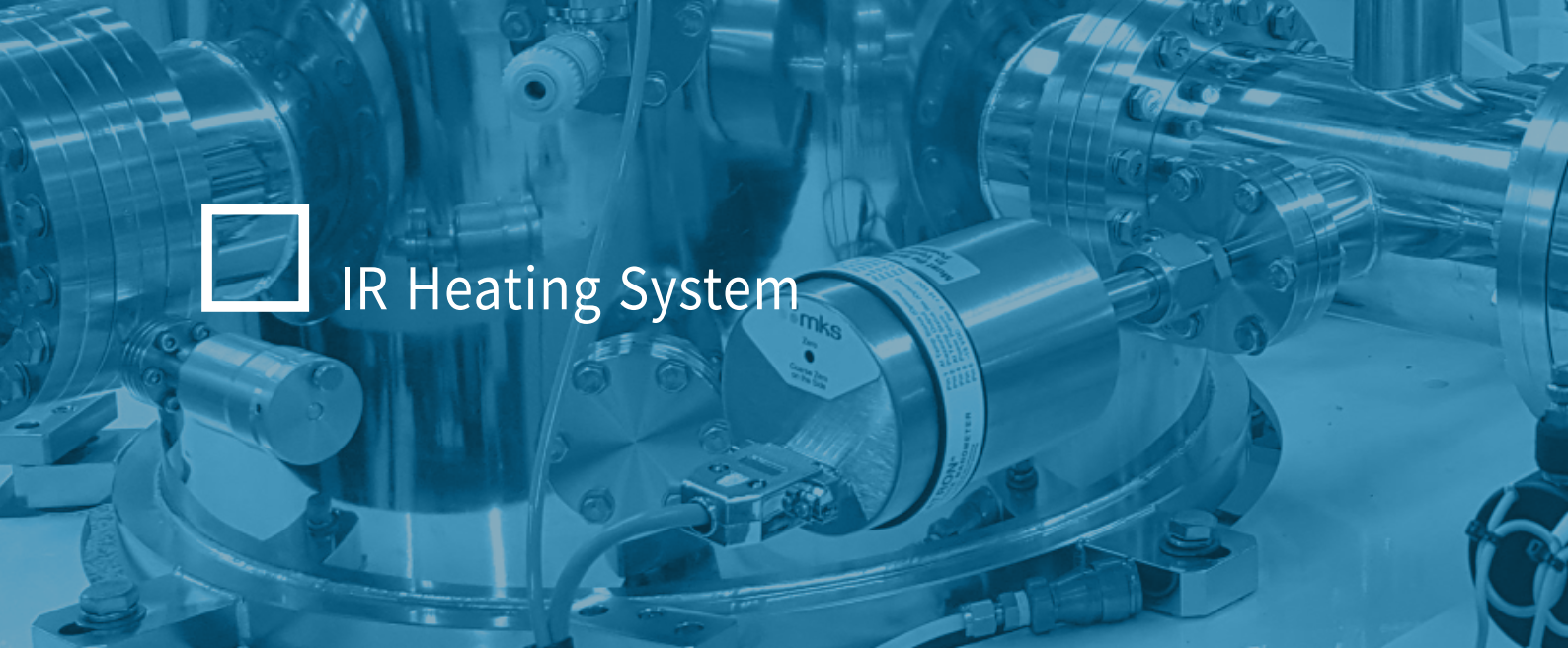


Fig. 3-24. H_2 desorption rate vs time: epitaxial Ge layer #2



IR Heating System

High speed, high temperature
MAX. heating rate 150 °C/s reaching 1,500 °C at maximum.

Non-contact heating
Enable to heat the sample without physically contacting it.

Pinpoint heating
Heating only the samples without surroundings.

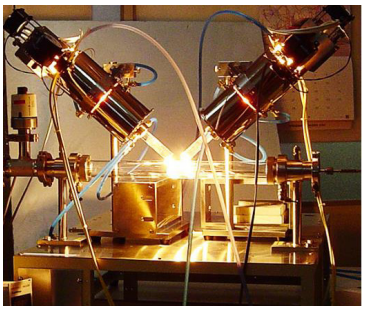
Clean-heating
Eliminating the risk of air pollution.

360 ° degrees
Infrared beams irradiates the sample from any angle 360 °

5 × 10 $^{-9}$ Pa at maximum
Enable to heat the samples in a vacuum atmosphere.

Easy to add on
Can be attached to your equipment.

Cost saving
Less investment cost compared to conventional heating systems.



• Heating in vacuum or
an oxidizing atmosphere

Infrared guide section

GVL298

Vacuum chamber

Inside vacuum chamber

• Heating in atmosphere

• Temperature control devices

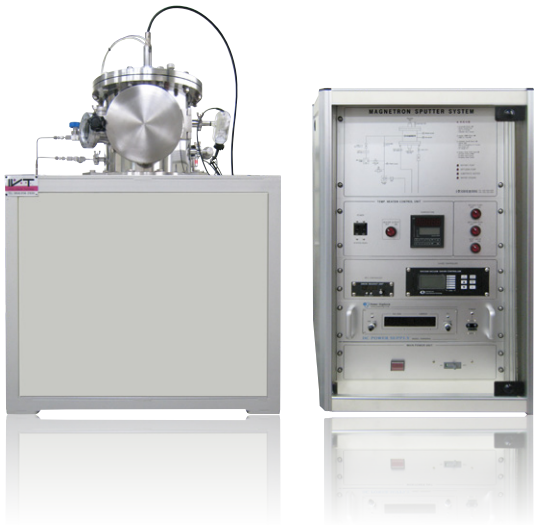
Overviews

Model name	GVH198	GVH298	GV198	GVL298
Infrared lamp rating	1 kW	2 kW	1 kW	2 kW
Maximum attainable temperature	1,200 °C	1,400 °C	1,300 °C	1,500 °C
Heated surface area	Ø 20 mm			
Maximum heating rate	1 °C/s		100 °C/s	150 °C/s
Maximum attainable vacuum degree	5×10^{-9} Pa		5×10^{-7} Pa	
Cooling water flow rate	1 L/min	2 L/min	1 L/min	2 L/min

Vacuum Deposition System & Furnace

IVT has deposition and heating system technology applying various heat sources under high vacuum and ultra - high vacuum environment.

IVT拥有适用高真空、超高真空环境下的各种热源的沉积、加热系统技术。



DC Magnetron Sputter

· Available in single & multi sputter sources with water cooling system.
· Available in high voltage power supply (3 kW ~ 10 kW)
· Substrate Rotation & Heating (100 °C up to 400 °C)
· Source size from 3" to 8", User defined source size available.

E-Beam Evaporation System

· Single/Multi Pocket E-Beam source with Water Cooled Crucible (4 cc up to 75 cc) with individual shutter
· High Voltage Power Supply (3 kW to 15 kW)
· X-Y Beam Sweep & Controller
· 4" Diameter View Port on Front Door With Manual Shutter

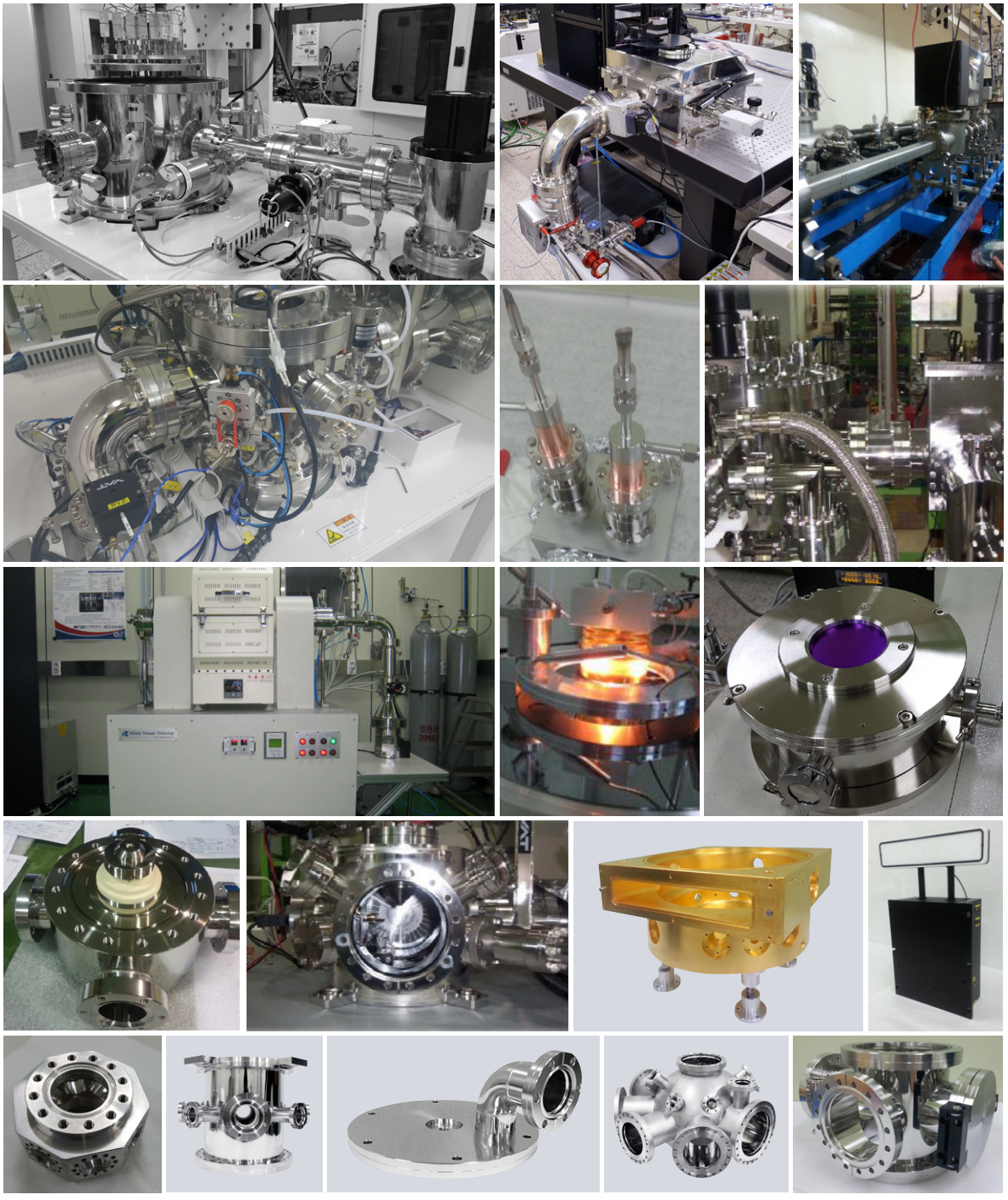
Vacuum Furnace

· Working Temperature : 500 °C ~ 2,300 °C
· Working Zone : 300 mm^3 ~ 500 mm^3
· Chamber Shape : cylinderical, rectangular, spherical
· Heater : sheath, super kantal, halogen, graphite
· Atmosphere : vacuum, ar
· Auto Vent & Radiation Thermometer

Customized Vacuum System & Components

IVT has been supplied various vacuum based systems to Korean domestic universities and government - contributed research institutes satisfying user's requirement for design and characteristics.

IVT已经为国内大学和研究机构提供了一系列基于真空的系统，以满足用户的设计要求和特性。



Ceramic(Lithium Titanate) Pebbles

There has been a limitation that existing ceramic ball production type is difficult to apply on proliferation production type for Nuclear Fusion Reactor using lithium titanium oxide because there is a restriction on ball size and impurities generation and so on.
lithium titanium oxide (Li2TiO3) is used as a tritium proliferation for Nuclear Fusion Reactor.
We developed the production system possible to mass produce more than 50 kg yearly.

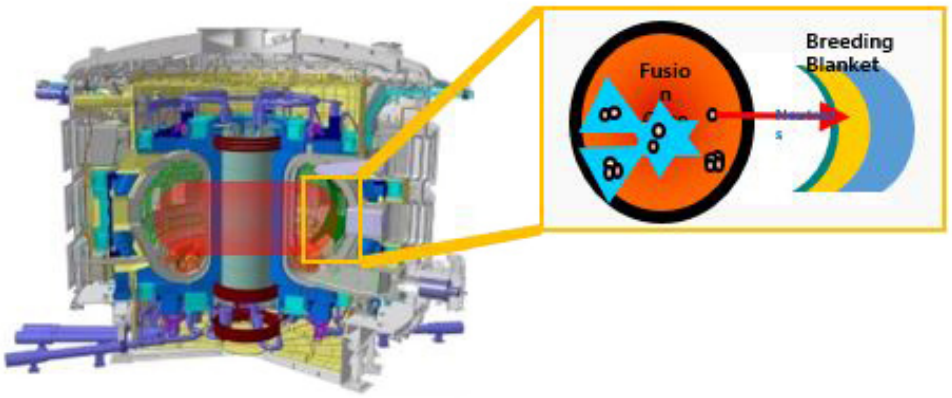
传统陶瓷球的生产方式受球大小和杂质生成等的制约，难以应用于利用锂钛氧化物进行核聚变的增生材料生产方式。锂钛氧化物(Li_2TiO_3)用作核聚变炉用三重氢增生材料。本公司开发了每年可大规模生产50公斤以上的生产系统。

Specification

Diameter : 1.0 (± 0.05) mm
Roundness : < 0.05 mm
Purity : < 10 ppm

Applications

Breeding Blanket
For Fusion Reactor



Features

Pebbles

High thermal conductivity, stability
High chemical stability
High mechanical resistance

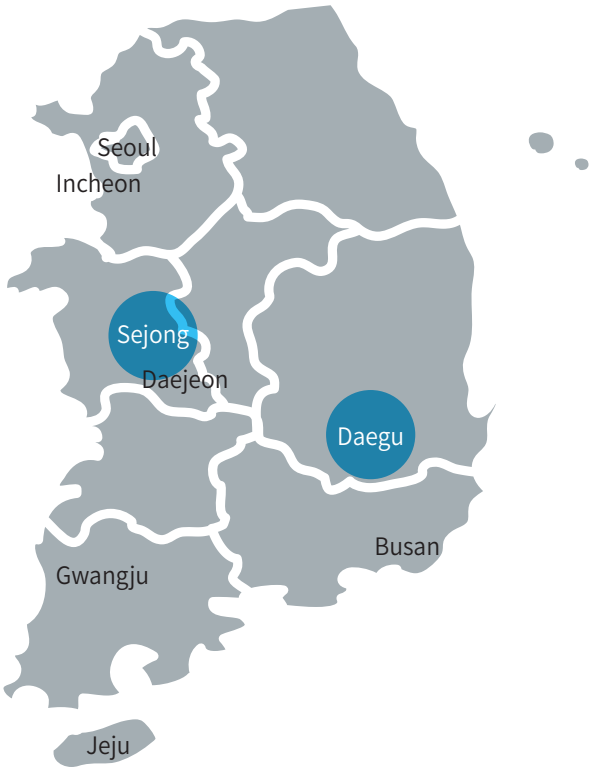
Manufacturing System

Patented dispensing & washing technology
Capacity: 50 kg per year
Fully automatic operation

Contact Us

We receive the inquiries and requests for TDS analysis on-line at all times.
It is possible to discuss more conveniently if you send us our below representative e-mail for technical inquiries and questions related with our products.

随时在线受理与TDS有关的的分析咨询及委托事项。
与此相关的技术咨询及疑问等，请发送至以下官方e-mail，方便洽谈。



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