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高端化工装备

HIGH-END CHEMICAL EQUIPMENT

山东豪迈机械制造有限公司

HIMILE MECHANICAL MANUFACTURING (SHANDONG) CO.,LTD

地址: 山东省潍坊市高密市经济开发区东庄村横三路1号
Add: No.1 Hengsan road, Economic development zone, Gaomi, Weifang, Shandong, China

传真/(Fax): 0536-2120763

电话/(Tel): 0536-2120061

网址/http: www.himile.com

邮箱/E-mail: es@himile.com

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01

集团简介 COMPANY PROFILE

豪迈始创于1995年，国际化集团公司，辖1家上市公司（SZ.002595）、8家海外生产型公司，形成覆盖全球的研发、生产和服务体系。

公司业务领域涉及化工装备、海工油气装备、压缩机、高端机械零部件制造、轮胎模具、数控机床等，与30多家世界500强企业长期合作。

富有特色的企业文化，强大的技术研发能力，雄厚的机械加工实力，以及遍及全球的售后服务体系，形成了豪迈强劲的创造力、生产力和竞争力。

Founded in 1995, Himile is an international group company, 1 listed company (SZ.002595) and 8 overseas satellite shops, forming a global R & D, manufacturing and service system.

The company's main business fields involve chemical equipment, offshore oil and gas equipment, compressors, high-end mechanical parts manufacturing, tire molds, CNC machine tools, and also established long-term cooperation with more than 30 of the world's top 500 enterprises.

With unique corporate culture, powerful technology R&D capabilities, strong mechanical machining ability, as well as worldwide after-sales service system, Himile has formed its own strong creativity, productivity and competitiveness.



1 Listed Company



5 National Single Champion



8 Overseas Satellite Shops



Over 30 Fortune Global 500 clients

02 技术能力 TECHNOLOGY R&D CAPABILITY

公司长期致力于石油化工、煤化工、天然气、基础化工、精细化工、新能源等领域高端装备的研发、制造和销售，秉承“关注客户需求，持续改进提高”质量理念，为客户提供优质的服务。

The company has long been committed to the R&D, manufacturing and sales of high-end equipment in petrochemical, coal chemical, natural gas, basic chemical, fine chemical, new energy and other fields, adhering to the quality vision of "focus on customers' requirements, improve ourselves persistently", to provide customers with high quality services.

— 设计理念 Design Concept —

先进的模块化设计理念，结合高效装备制造能力，形成高质量的工程技术团队；与国内外一流工程（EPC）公司、设计院、各行业领军企业保持合作，不断吸收融入先进理念。

Advanced modular design concepts, combined with efficient equipment manufacturing capabilities, to form a high-quality engineering and technical team; Maintain cooperation with numerous domestic and foreign first-class engineering (EPC) companies, design institutes, and leading enterprises in various industries, and continuously absorb and integrate advanced concepts.

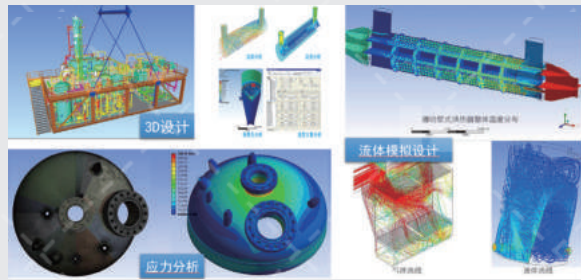


— 设计平台 Design Platform —

拥有工艺设计、工程设计、热工设计、容器设计、三维建模于一体的设计平台；吸收国内外标准、业主要求，构建各专业统一设计体系，亦可根据业主要求定制专属设计规范。

With design platform integrating process design, engineering design, thermal design, container design, and 3D modeling;

Absorbing domestic and foreign standards and owner requirements, establishing a unified design system for various disciplines, and also can customize exclusive design specifications according to the owner's needs.



— 技术平台 Technology Platform —

与全球传热和热交换技术提供商美国传热研究公司（HTRI）合作，优化设计热交换设备；具有自主知识产权的绕管式热交换器计算软件，并制定该产品行业标准《HG/T 5108-2016》。

Working with HTRI, a global provider of heat transfer and heat exchange technology, to optimize the design of heat exchange equipment;

With independent intellectual property rights of spiral wound tube heat exchanger calculation software, and the development of product industry standard HG/T 5108-2016.



03 资质认证 QUALIFICATION

公司拥有完善的管理体系，先后获得A1级大型高压容器、A6超高压容器制造许可证；规则设计许可证；ISO9001质量管理体系、ISO14001环境管理体系及ISO45001职业健康与安全管理体系；ASME U&U2&U3钢印；NB颁发的NB&R钢印；ISO3834-2国际焊接企业完整质量体系；DNV、BV、CCS、KR、RINA船级社等30多项资质；拥有授权专利666项，其中发明116项，实用新型476项。

Himile has comprehensive management system and has obtained numerous certifications, including A1 large high-pressure vessel and A6 ultra-high-pressure vessel manufacturing licenses, Regulation design license, ISO9001 Quality Management System, ISO14001 Environmental Management System, ISO45001 Occupational Health and Safety Management System, ASME U&U2&U3 stamps, the NB&R stamp issued by NB, the ISO 3834-2 complete quality system for international welding enterprises, and over 30 certifications from classification societies such as DNV, BV, CCS, KR, and RINA. The company possesses 666 authorized patents, including 116 invention patents and 476 utility model patents.



04

生产制造能力 MANUFACTURING CAPABILITY

豪迈制造下设豪迈化工装备工业园，豪迈启东和豪迈重型装备两座码头工厂。室内加工面积：46.6万余平方米。
为客户提供设备研发、选型、设计、制造的一站式服务，承接特材，重型、超尺设备及换热器、撬撬、模块的建造。
材质涵盖碳钢、低合金钢、不锈钢、双相钢、铜合金、铝合金、钛及钛合金、镍及镍合金、锆及锆复合板、碳化硅等。

Himile Mechanical Manufacturing has Himile Chemical Equipment Industrial Park, and 2 dock factories including Himile Qidong and Himile Heavy Equipment, covering total processing area of 466000 m², which can provide customers with equipment R&D, selection, design, manufacturing one stop service also the manufacturing of special material, heavy, oversized equipment and heat exchanger, skid and module. Materials include carbon steel, low alloy steel, stainless steel, duplex steel, copper alloy, aluminum alloy, titanium and titanium alloy, nickel and nickel alloy, zirconium and zirconium composite plate, silicon carbide and so on.

豪迈化工装备工业园

HIMILE CHEMICAL EQUIPMENT INDUSTRIAL PARK



38.1万m²

室内加工面积
Indoor Processing Area

320 t

起重重量
Lifting Weight

18 m

起重高度
Lifting Height

8100m²

特材洁净车间
Clean Workshop for Special Material

豪迈重型装备

HIMILE HEAVY EQUIPMENT



5.3万m²

室内加工面积
Indoor Processing Area

640 t

起重重量
Lifting Weight

23 m

起重高度
Lifting Height

12万m²

室外装配面积
Outdoor Assembly Area

25t/m²

地面承载能力
Supporting Capacity

-10.9 m

水深
Water Depth

390 m

泊位长度
Berth Length

2×20,000 t

泊位
Berth

豪迈启东规划图

HIMILE QIDONG (PLANNING MAP)



30万m²

室内加工面积
Indoor Processing Area

400t

起重重量
Lifting Weight

35m

起重高度
Lifting Height

25万m²

室外装配面积
Outdoor Assembly Area

75t/m²

地面承载力
Supporting Capacity

1055m

自有码头岸线
Owning Water Coastline

05

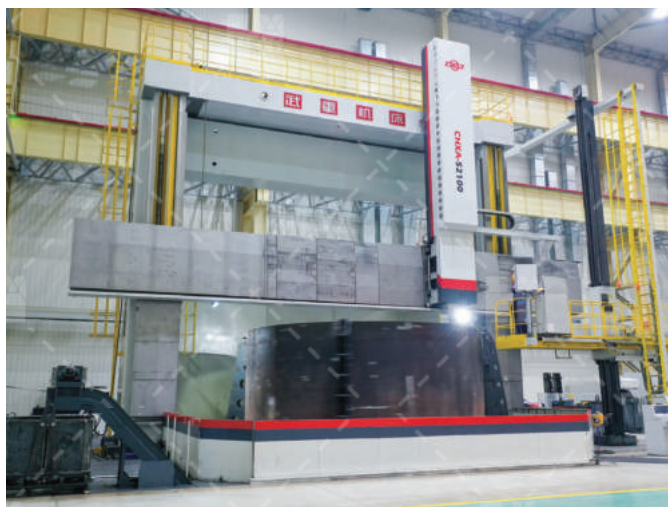
装备能力 EQUIPMENT CAPABILITY

豪迈具备强大的专机研发、加工制造和焊接能力，拥有加工、焊接、热处理和无损检测等先进装备5000余台套，可提供各类化工装备从设计、焊接到装配检测等一站式服务。

Himile has strong special equipment R&D capability, processing and manufacturing and welding capabilities, with more than 5000 sets of advanced equipment including processing, welding, heat treatment and NDT, can provide all kinds of chemical equipment from product design, welding to assembly test and other one-stop services.



希斯龙门 (加工范围:21000×8000×5000mm)
SCHIESS Gantry Machine (Working range: 21000×8000×5000mm)



武重CHXA-52100车铣复合
(加工范围:10000x7000mm, 工作台最大直径8000mm, 载重250t)
CHXA-52100 Turn-Mill combination
(Working range: 10000x7000mm, Worktable up to 8000mm, load 250t)



200mm卷板机
200mm plate rolling machine



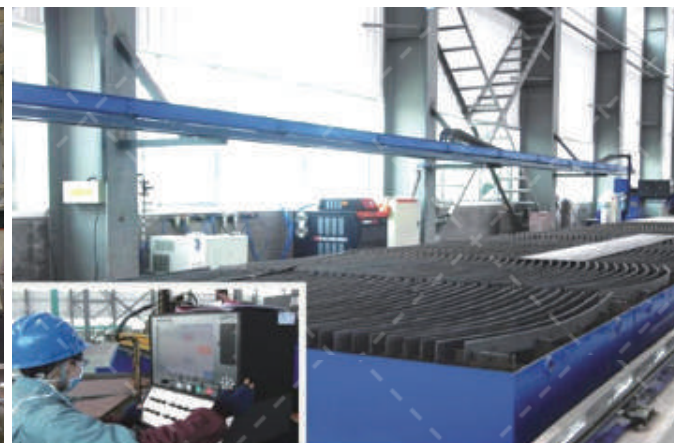
80T焊接变位仪
80T welding positioner



大壁厚、窄间隙埋弧焊机 (最大焊接厚度300mm)
Large Wall Thickness and Narrow Gap SAW Machine (Max. welding thickness is 300mm)



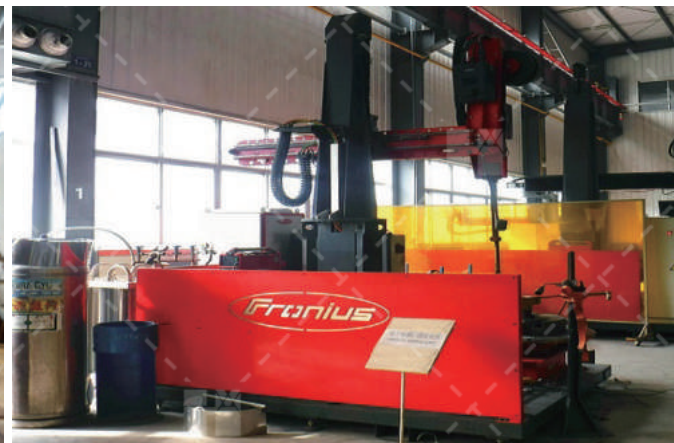
热处理炉
(尺寸 51×11.5×13m; 允许最大工件50*10.5*12米; 热处理台车牵引力最大1200t)
Heat treatment furnace
(dimension 51000mm×11500mm×1300mm, Maximum Workpiece Dimensions 50*10.5*12m, Heat Treatment Car Pulling Force Max.1200t.)



激光下料机
CNC Flame/Plasma Cutting Machine



松下柔性焊接及切割机器人
Panasonic Flexible Welding & Cutting Robot



氩弧焊机
Fronius Automatic TIG Welding Machine

06 检测能力 INSPECTION CAPABILITY

豪迈理化实验室成立于2008年，2021年6月获得中国合格评定国家认可委员会实验室认可证书（CNAS资质），具备拉伸试验、冲击试验（最低可做到-196℃）、硬度试验、光谱试验、腐蚀试验、弯曲试验、金相试验等25项检测资质。

The physical and chemical laboratory was established in 2008 and obtained the Laboratory Accreditation Certificate of China National Accreditation Service for Conformity Assessment (CNAS qualification) in June 2021, with 25 testing qualifications such as tensile test, impact test (the minimum can be -196°C), hardness test, spectrum test, corrosion test, bending test and metallographic test.



移动式光谱仪
Movable Direct Reading Spectrometer



微机控制电液伺服万能试验机
Laser Scanning Confocal Microscope



电子拉力试验机
Tensile testing machine



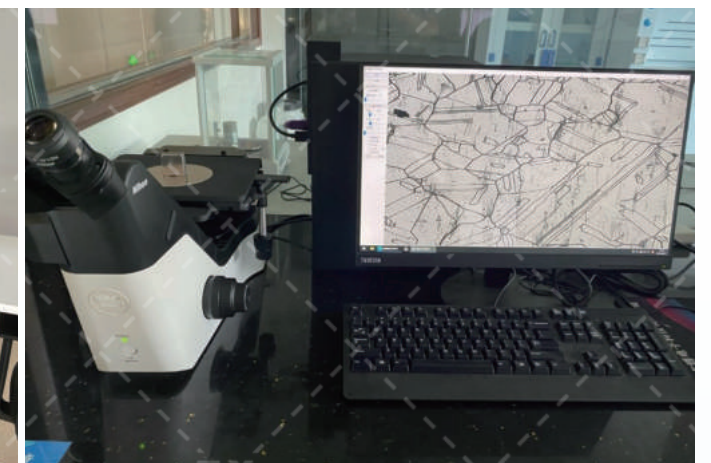
低温冲击试验机
Low temperature impact testing machine



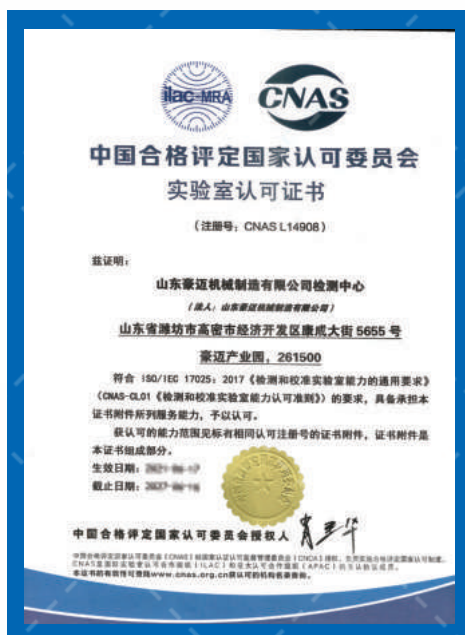
化学实验台
Chemical lab table



钨丝环境真空扫描电镜
Vacuum scanning electron microscope



尼康金相显微镜
Metalloscope



HIGH-END CHEMICAL EQUIPMENT 高端化工装备

01 绕管式热交换器 SPIRAL WOUND TUBE HEAT EXCHANGER

豪迈绕管式热交换器被认定为山东省制造业单项冠军产品，列入山东省节能环保目录，产品销量超过50000台，在石油化工、煤化工、精细化工、新能源、储能等细分领域沉淀了丰富的设计、制造、行业应用经验，助力客户增产、节能、降耗。

制定行业标准：HG/T 5108-2016 《不锈钢制小径管束螺旋缠绕管式换热器》

Himile spiral wound tube heat exchanger has been recognized as single champion product in Shandong Province manufacturing industry and been listed in Shandong Province energy conservation and environmental protection catalog. With product sales of more than 50000 units and rich design, manufacturing, industry application experience covering petrochemical industry, coal chemical industry, fine chemical industry, new energy, energy storage and other subdivisions, Himile has helped customers increase production, save energy and reduce consumption.

Establish industry standard: HG/T 5108-2026 "Stainless steel small tube bundle spiral wound tube heat exchanger"



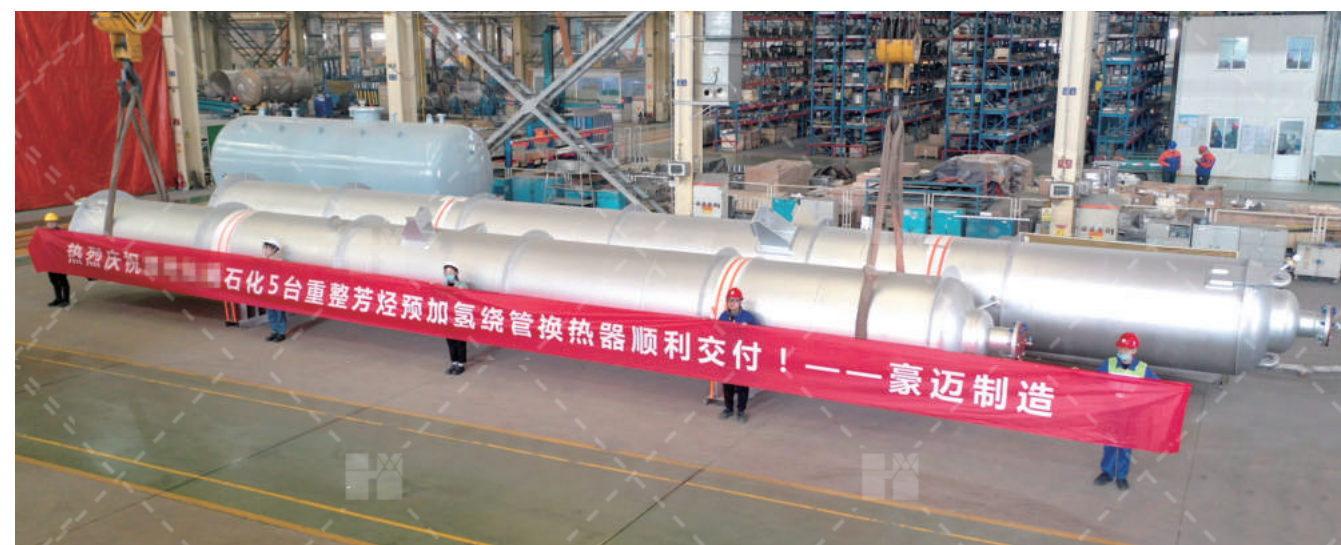
连续重整用绕管热交换器
Spiral wound tube heat exchanger for continuous reforming



新能源行业用绕管式热交换器
Spiral wound tube heat exchanger for new energy



低温甲醇洗用多股流绕管式热交换器
Multiflow spiral wound tube heat exchanger for rectisol process



重整加氢用绕管式热交换器
Spiral wound tube heat exchanger for reforming hydrogenation



绕管换热器生产车间
Spiral Wound Tube Heat Exchanger Production Workshop



乙酸甲酯-粗醇换热器 (DN2800×14800)
Methyl Acetate-Crude Glycol Heat Exchanger

豪迈专注于铜、钛、锆、镍、钽、铝及其合金等材质的高端装备的研发、设计、制造及安装服务，帮助客户推进技术改造，实现节能降碳、安全生产。

经过多年的发展和技术积淀，在整体方案设计、机械加工、成型、焊接、无损检测、热处理、现场检修等方面积累了丰富的经验，掌握了几十项国际先进、国内领先的大型装备关键制造技术，公司生产的多项特材热交换器、反应器均为国内首制，实现了我国在特材装备制造领域多项“零的突破”。

Himile focuses on the R&D, design, manufacturing and installation service of high-end equipment such as copper, titanium, zirconium, nickel, tantalum, aluminum and their alloys, to help customers promote technological transformation and achieve energy saving and carbon reduction and safe production.

After years of development and technical accumulation, the company has accumulated rich experience in overall proposal design, machining, molding, welding, NDT, heat treatment, onsite maintenance, etc. Himile has mastered dozens of international advanced and domestic leading large-scale equipment key manufacturing technologies, and a number of special material heat exchangers and reactors produced by Himile are the first in China. It has achieved a number of "zero breakthroughs" in the field of special material equipment manufacturing in China.

豪迈特材生产专用洁净车间，控制过程环境中悬浮粒子和铁离子浓度；空气温、湿度；气流流型和送风量；洁净区与周围的空间维持一定的压差，为装配和焊接提供特定环境，保证焊缝质量，提升设备整体使用寿命。建造标准：GB 50073-2013《洁净厂房设计规范》。

Himile special material workshop, control the suspended particles and iron ionconcentration, air temperature, humidity, air flow type and air supply volume, maintain certain pressure difference between clean area and surrounding environment and guarantee welding quality, to improve overall service life. Construction standard: GB50073-2013 *clean workshop Design Code*.



移动式洁净房 Movable clean room

百万级洁净车间 Million-Level clean welding workshop



万级洁净车间 Ten thousand-Level clean welding workshop



负压重组分塔 (DN3800×81470)
Vacuum Heavy Fractionation Tower



哈氏合金、超级双相不锈钢、双相不锈钢等特材加工的蒸发浓缩装置
Evaporation and concentration unit with Hastelloy, super duplex SS, duplex SS



钽材酸浓缩热交换器
Tantalum acid concentration heat exchanger



哈氏合金核心反应器
core reactor with Hastelloy



净化精馏塔塔顶冷凝器 (DN1970×15000)
Overhead Condenser for Purification Distillation Column



钛合金再生气热交换器
regas heat exchanger with Titanium alloy



镍基合金氧汽提塔回流热交换器
Oxygen tower reflux heat exchanger with nickel-based alloy

管壳式热交换器 SHELL AND TUBE HEAT EXCHANGER

豪迈专注于管壳式热交换器的研发与生产，形成多条列管热交换器生产线，可为客户提供固定管板式、浮头式、U形管式和釜式重沸器等容器产品；

制定行业标准：HG/T 5828-2021《螺旋折流板式热交换器》

制定行业标准：HG/T 5109-2016《无菌级双管板管壳式换热器》

自主研发的列管自动化生产线，保证了产品质量的稳定性，同时提高效率，可为客户缩短供货周期。

Himile focuses on the R&D and production of shell and tube heat exchanger, forming a number of production line for shell and tube heat exchanger, can provide customers with fixed tubsheet, floating head, U-type and kettle-type reboiler and other containers.

Establish industry standard: HG/T 5828-2021 "Spiral baffled plate heat exchanger"

Establish industry standard: HG/T 5109-2016 "Sterial double tube sheet shell and tube heat exchanger"

With independent R&D of shell and tube automatic production line, the company can ensure the stability of product quality, improve efficiency and also shorten the delivery time for customers.



循环塔列管再沸器 DN3500×11000mm
Circulating tower reboiler



溶剂热回收浮头式热交换器 DN2400×9900mm
Floating heat exchanger for solvothermal recovery



多效降膜再沸器 DN3200×10000mm
Multi-effect falling film reboiler



U形管式热交换器 DN1950×5000mm
U type Heat Exchanger



K型釜式热交换器 DN1100/2000×7300mm
K-type kettle heat exchanger



层熔式结晶器（波节管）DN3000×8000mm
Layer melt crystallizer (corrugated tube)



发卡式热交换器 DN700×6392mm
Hairpin heat exchanger



组合式热交换器 DN1200×4500mm
Combined heat exchanger



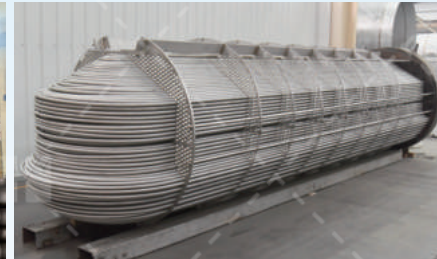
三管板循环气预热器
DN1400×4500mm
Circulating gas preheater
with 3 tube sheets



低压加热器
Low-Pressure Heater



波纹管热交换器 DN2700×14380mm
Corrugated Tube Heat Exchanger



螺旋折流板式热交换 DN1600×8949mm
Helical Baffle Heat Exchanger

04 碳化硅热交换器 SILICON CARBIDE TUBE HEAT EXCHANGER

豪迈率先实现从核心碳化硅换热管、防腐零部件到碳化硅热交换器整体装配制造，国内率先实现4米长碳化硅换热管生产制造，目前拥有共计33台套超高温无压碳化硅换热管烧结炉群。产品销量超过20000台，规模以及销量均位于行业前列。

Himile takes the lead to achieve independent manufacturing of the core silicon carbide heat exchange tube, the manufacturing of anti-corrosion parts, and the whole process from manufacturing to assembly of silicon carbide tube heat exchanger. We are also the first company to produce 4 meters long silicon carbide heat exchange tube in China. At present, Himile owns a total of 33 ultra-high-temperature non-pressurized silicon carbide tube furnace groups, with a product sales volume exceeding 20,000 sets, ranking among the top in the industry in both scale and sales.



碳化硅管烧结炉
Silicon carbide tube sintering furnace

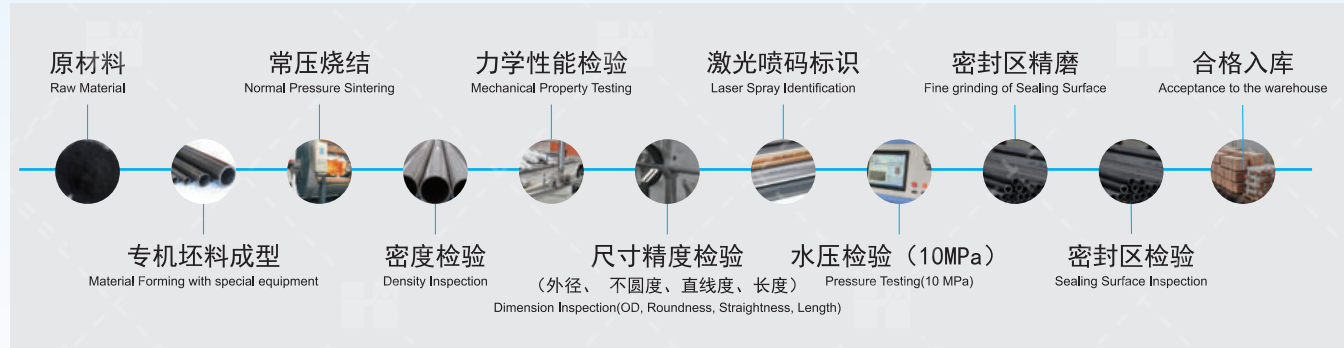


碳化硅热交换器DN1200×4000mm
Silicon carbide tube heat exchanger



批量碳化硅热交换器发货
Delivery site for silicon carbide tube heat exchanger

碳化硅换热管质量控制环节 Quality control of silicon carbide heat exchange tubes



1) 碳化硅管尺寸精度检测 Dimensional accuracy Inspection of Silicon Carbide tubes

对SSIC换热管的外径、不圆度、直线度、长度做高精度检测，并根据检测精度要求自动实现对换热管的筛选和分类存放，并将检测结果和管材编码用激光标记在管材上，使检测结果具有追溯性。

Carrying out high-precision detection for OD, roundness, straightness, length of the SSIC heat exchange tube, and all tubes will be selected and categorized automatically based on inspection, the inspection result and tube code will be marked with laser for traceability.

2) 碳化硅管强度检测 Strength Inspection of Silicon Carbide tubes

根据不同的长度，对SSIC换热管施加额定压力使其发生弯曲变形，然后对换热管进行360°旋转压力测试，以检测换热管的强度和内部缺陷。

According to different length, the rated pressure is applied to SSIC heat exchange tube to make it bend and deform, and then 360° rotary pressure test is carried out on the heat exchange tube to detect the strength and the internal defects of the tube.

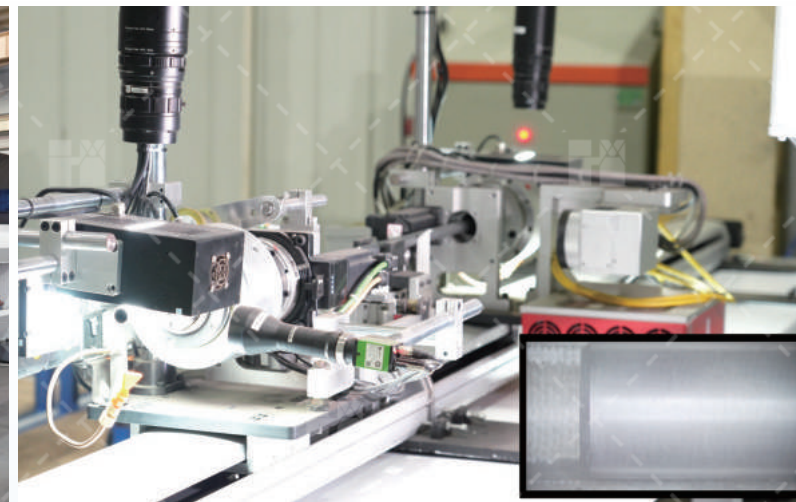
3) 密封区检验 Inspection of Sealing Area

对精磨后的两端密封区进行500倍电子放大镜检查，确保精磨后密封区表面光滑，无裂纹、凹坑等缺陷，以满足密封要求。

500 times electronic magnifying glass is used to inspect the sealing areas at both ends after fine grinding, so as to ensure the surface of the sealing area after fine grinding is smooth and free from defects such as cracks and pits, so as to meet the sealing requirements.



尺寸精度检测
Dimensional accuracy inspection



光学检测
Optical Testing

连续流反应装备

CONTINUOUS FLOW REACTION EQUIPMENT

2014年开始，公司致力于连续流微反应技术的研发与应用，目前拥有专业技术人员200余人，涉及化学合成、材料化学、化工工艺、化工工程、机械设计、电气设计、化工机械、过程控制等专业，可以完成实验研发、材料选型、反应风险评估、设备效果验证等，保证工艺与设备的完美结合，为产业化装置稳定生产提供有力保障。

公司发挥多学科优势，持续深耕连续流特色技术，利用丰富的连续流实践经验，成功打通卤苯类硝化、苯胺类重氮化、硫醚类氧化、非典型卤化、过氧化、有机硅/有机磷、醇胺、醇醚类反应连续流工艺流程。

豪迈致力于构建贯穿精细化工研发、生产全流程的技术服务体系，努力为推动连续流微反应技术应用推广，促进化工行业安全、环保、高质量发展做出更大贡献。

Since 2014, the company has been committed to R&D and application of continuous flow micro-reaction technology. At present, Himile has more than 200 professional and technical personnel, involving chemical synthesis, material chemistry, chemical process, chemical engineering, mechanical design, electrical design, chemical machinery, process control and other majors. Himile team is capable in experimental R&D, material selection, reaction risk assessment, equipment effect verification, etc., own the ability to ensure the perfect combination of process and equipment, and provide a strong guarantee for the reliable production of industrial equipment.

Himile utilizes the advantages of multiple disciplines, continuously deepens unique technology of continuous flow, and makes use of rich continuous flow practical experience to successfully open up the continuous flow processes of halogenated benzenes, aniline diazotization, thioether oxidation, atypical halogenation, peroxide, silicone/organophosphorus, alcoholamine and alcohol ether reactions.

Himile is committed to building a technical service system that runs through the whole process of fine chemical R&D and production, and strives to promote the application and promotion of continuous flow micro-reaction technology and make more contributions to the safety, environmental protection and high-quality development of chemical industry.

豪迈微通道反应器

Himile Microchannel Reactor

通过精密微加工技术制造的微型化工反应装备，微结构尺寸处于毫米甚至微米级别。

Micro chemical reaction equipment manufactured by precision micromachining technology, the microstructure size reaches to millimeter or even micron level.



性能指标

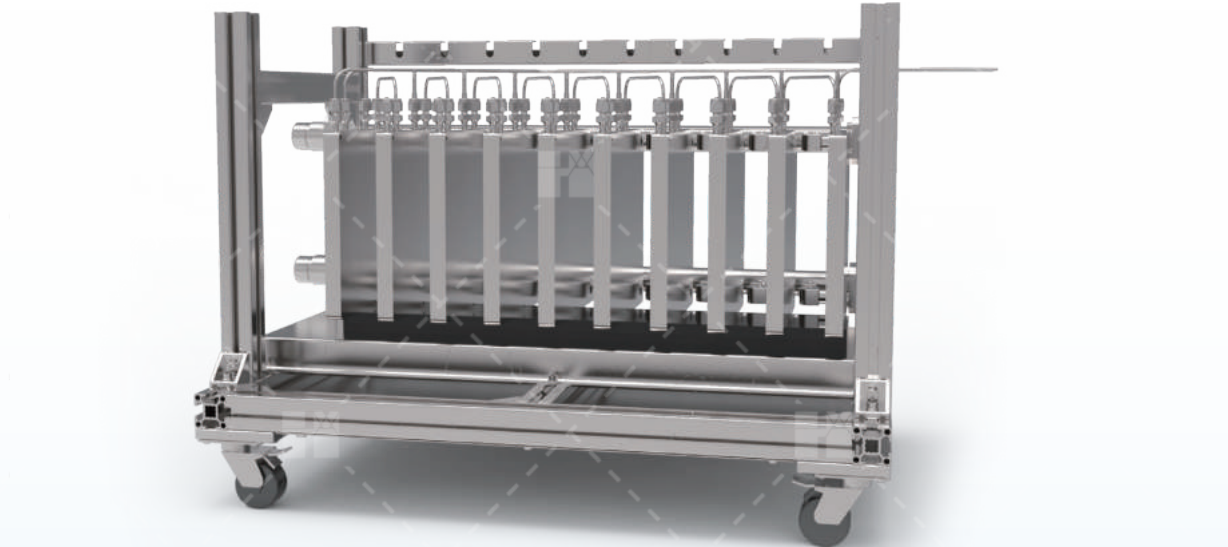
PERFORMANCE INDEX

性能提升 Performance Improvement	参数指标 Parameter Index	豪迈微通道反应器 Himile Microchannel Reactor	传统夹套搅拌釜 Traditional Jacket Stirred Tank
换热提升 Heat Transfer Enhancement	比换热面积 (m ² /m ³) Volumetric Heat Interchanging Area	3500~5000	2.5~10
	比换热系数 (kW/(m ³ ·K)) Volumetric Heat Transfer Coefficient	500~9700	1~10
传质提升 Mass Transfer Enhancement	比气液相界面积 (m ² /m ³) Phase Contact Area per Unit Volume	3000~10000	200~2000
本质安全 Intrinsic Safety	持液量(m ³) Holdup Capacity	0.0027~0.01	3~10
	比持液量(m ³ / (m ³ /s)) Space-time Processing Capacity	≥0.001	0.5-10
占地缩小 Occupied area reduction	占地面积 (m ²) Land Occupation	5~10	100

特点优势

ADVANTAGE

◆ 持液量小 Small holdup capacity	◆ 自动化程度高 High-level automation	◆ 确保操作本质安全 Ensure intrinsically safe operation
◆ 增强传质性能 Mass transfer performance enhancement	◆ 反应温度精准控制 Precise control of reaction temperature	◆ 独特的伞形通道结构 Unique umbrella-shaped channel structure
◆ 显著提高流体混合程度 Significantly improve fluid mixing degree	◆ 双面换热结构及时移走反应热 The double-sided heat transfer structure removes the reaction heat in time	



■ 常规型号
TYPE

豪迈微通道反应器(实验装置)
Himile Microchannel Reactor(Lab-scale Device)

型号 Type	主体材质 Material	反应块 尺寸(mm) Reaction Block Size	反应块 温度范围(°C) Reaction Block Temperature Range	反应块压力范围 (MPa(常温下)) Reaction Block Pressure Range	单块持液量(ml) Holdup Capacity per Block
SSA2010(键合) (Bonding)	S31603	180×180	-40~200	0-15	8.8-10
CSA1810(键合) (Bonding)	SiC	180×180	-25~200	0-2.5	8.8-10
SSB2010(可拆) (Detachable)	S31603	200×200	-25~200	0-6	8.8-10
CSB1810(可拆) (Detachable)	SiC	180×180	-25~200	0-2.5	8.8-10
SSC2010(键合) (Bonding)	S31603	180×180	-60~300	0-15	8.8-10
CSC1810(键合) (Bonding)	SiC	180×180	-30~200	0-3	8.8-10

注：材质可选S31603/N10276/R60702/TA2等；换热性能可定制双温区或流量可调；反应块的持液量、压力、温度均可定制。
Material is optional: S31603/N10276/R60702/TA2, etc.; heat transfer performance can be customized to be double temperature zone or adjustable flow rate; the holdup capacity, pressure and temperature of reaction block can also be customized.

豪迈微通道反应器(产业化装置)
Himile Microchannel Reactor(Industrial-scale Plant)

型号 Type	主体材质 Material	反应块 尺寸(mm) Reaction Block Size	反应块 温度范围(°C) Reaction Block Temperature Range	反应块压力范围 (MPa(常温下)) Reaction Block Pressure Range	单块持液量(ml) Holdup Capacity per Block
SSB4050(可拆) (Detachable)	S31603	452×416	-25~200	0-6	260-300
CSB4050(可拆) (Detachable)	SiC	400×350	-25~200	0-5	260-300
SSC4050(键合) (Bonding)	S31603	410×360	-60~300	0-15	260-300
CSC4050(键合) (Bonding)	SiC	400×350	-40~200	0-5	260-300

注：材质可选S31603/N10276/R60702/TA2等；换热性能可定制双温区或流量可调；反应块的持液量、压力、温度均可定制。
Material is optional: S31603/N10276/R60702/TA2, etc.; heat transfer performance can be customized to be double temperature zone or adjustable flow rate; the holdup capacity, pressure and temperature of reaction block can also be customized.

■ 适应情景
APPLICATION

适用于液液均相/非均相、高压气液相等工况，覆盖各种低温、高温、高危等危险工艺。

It is suitable for liquid-liquid homogeneous/heterogeneous, high-pressure gas-liquid phase and other conditions, and cover a variety of low-temperature, high-temperature, high-risk and other dangerous processes.

豪迈动态管式反应器
Himile Dynamic Tubular Reactor

豪迈动态管式反应器是一种集高效换热、混合、反应和控制于一体的连续管式反应系统。

Dynamic tubular reactor is a continuous tube reaction system which integrates high-efficiency heat transfer, mixing, reaction and control.



■ 性能指标
PERFORMANCE INDEX

性能提升 Performance Improvement	参数指标 Parameter Index	豪迈动态管式反应器 Himile dynamic tubular reactor	传统夹套搅拌釜 Traditional Jacket Stirred Tank
换热提升 Heat Transfer Enhancement	比换热面积 (m ² /m ³) Volumetric Heat Interchanging Area	≥30	2.5~10
	比换热系数 (kw/(m ³ ·k)) Volumetric Heat Transfer Coefficient	≥25	1~10
传质提升 Mass Transfer Enhancement	比气液相界面积 (m ² /m ³) Phase Contact Area per Unit Volume	≥6000	200~2000
本质安全 Intrinsic Safety	持液量 (m ³) Holdup Capacity	0.005-0.2	3~10
	比持液量 (m ³ /(m ³ /s)) Space-time Processing Capacity	≤300	≥600
占地缩小 Occupied Area Reduction	占地面积 (m ²) Land Occupation	5~10	100

■ 特点优势
ADVANTAGE

体积小
Small land occupation

传质传热效率高
High-efficiency of Mass and Heat Transfer

可实现内外双换热
Internal and External Heat Transfer



可实现连续自动化生产
Continuous Automated Production

拥有独特专利设计
Patented Unique Design
CN201911094943.4
CN201910430778.9
CN201910430791.4

■ 常规型号
TYPE

豪迈动态管式反应器(实验装置)
Himile Dynamic Tubular Reactor(Lab-scale Device)

型号 Type	主体材质 Material	尺寸(长×宽×高)/mm Size(length* width*height)	持液量 (L) Holdup Capacity	温度 (°C) Temperature	压力 (MPa (常温下)) Pressure(MPa, (atm.))	比表面积(m²/m³) Volumetric Surface Area
SHA1006	S31603	2000×720×1400	1.5	-15~150	0-1.5	~190
SHA0806	S31603	1540×720×1300	1	-15~150	0-1.5	~210
SHA0705	S31603	1500×850×1300	0.5	-15~150	0-1.5	~355
定制型 customized	可定制 customizable	/	可定制 customizable	-40~300	2	/

注：金属材质可选S31603/N10276/R60702/TA2等。
Material is optional: S31603/N10276/R60702/TA2, etc.; heat transfer performance can be customized to be double temperature zone or adjustable flow rate; the holdup capacity, pressure and temperature of reaction block can also be customized.

豪迈动态管式反应器(产业化装置)
Himile Dynamic Tubular Reactor(Industrial-scale Plant)

型号 Type	主体材质 Material	尺寸(长×宽×高)/mm Size(length* width*height)	持液量 (L) Holdup Capacity	温度 (°C) Temperature	压力 (MPa (常温下)) Pressure(MPa, (atm.))	比表面积(m²/m³) Volumetric Surface Area
SHA1327	S31603	2600×1200×1800	~50	-15~150	0-1	~60
SHA1831	S31603	3000×1200×1800	~100	-15~150	0-1	~55
SHA2235	S31603	3300×1300×1800	~150	-15~150	0-1	~40
SHA2438	S31603	3800×1400×1800	~200	-15~150	0-1	~30
定制型 customized	可定制 customizable	/	可定制 customizable	-40~300	1.5	/

注：金属材质可选S31603/N10276/R60702/TA2等；换热性能可定制双温区或流量可调；反应块的持液量、压力、温度均可定制。
Material is optional: S31603/N10276/R60702/TA2, etc.; heat transfer performance can be customized to be double temperature zone or adjustable flow rate; the holdup capacity, pressure and temperature of reaction block can also be customized.

■ 适应情景
APPLICATION

适用于固液反应、液液均相/非均相等工况，覆盖各种低温、高温、高危、反应结晶等工艺。

It is suitable for solid-liquid, liquid-liquid homogeneous/heterogeneous etc, and cover a variety of low temperature, high temperature, high risk. reactive crystallization and other dangerous processes.

■ 一站式服务
ONE-STOP SERVICE

可行性评估
Feasibility assessment



中试、工业化方案与成套装置
Pilot, industrialization program and complete plant



研发与优化
R&D and optimization



产品后处理的连续化方案
Continuous solution of post processing



■ 实验室展示
LABORATORY DEMONSTRATION



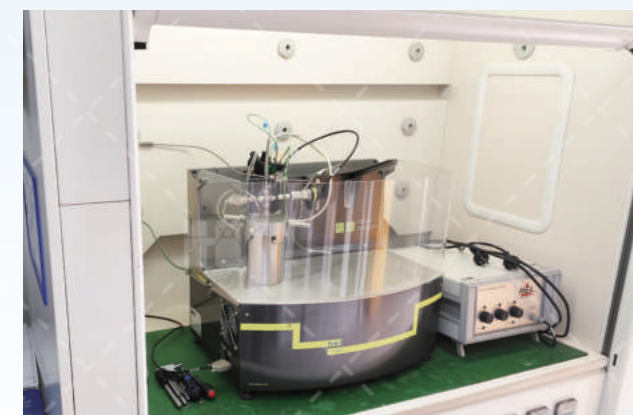
紫外分光光度计 UV Spectrophotometer



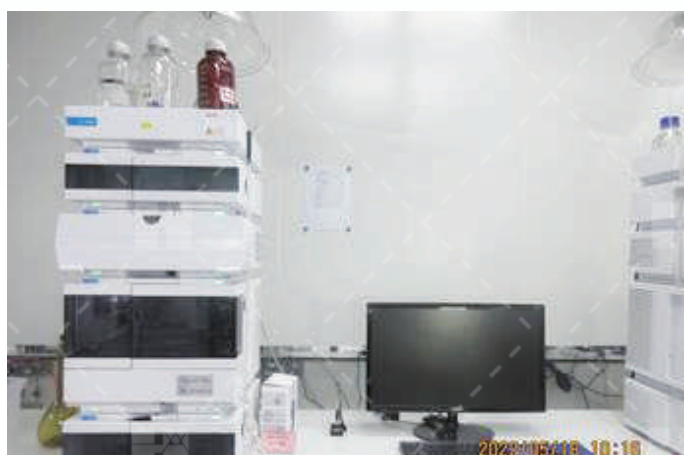
卡尔费休 Karl Fischer



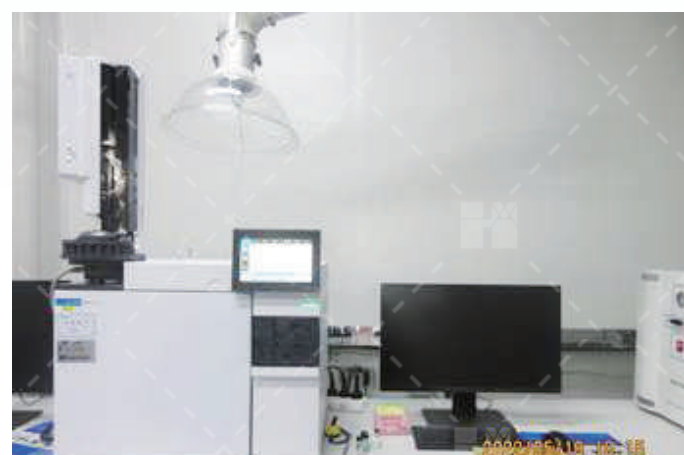
RC1



ARC



液相色谱仪 Liquid Chromatograph



气相色谱仪 Gas Chromatograph



ARC1



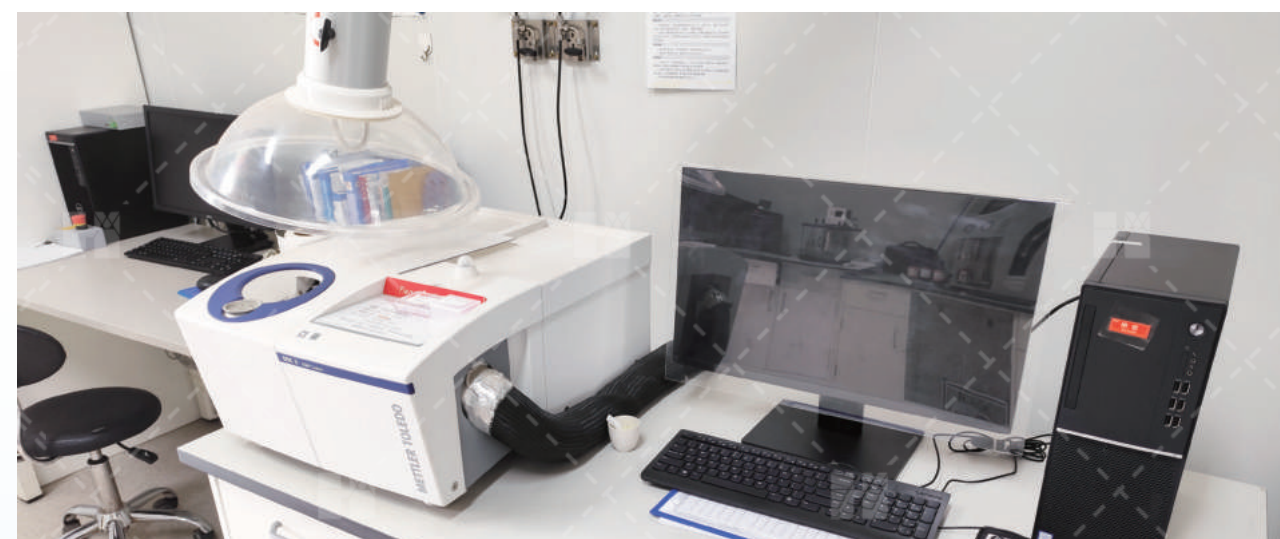
DSC1



液质联用 LC-MS



液质联用 LC-MS



DSC

硝化反应
Nitrification
4500t/a

传统釜式工艺
Traditional Kettle Process

工艺危险易爆
Dangerous and explosive process

滴加工艺
生产效率低
Low efficiency of drip process



连续化在线生成、分离及使用
Continuous online generation, separation and use

安全性好
High safety performance

生产效率高
High production efficiency

占地面积小
Small land occupation

实现了无人值守
Unattended

降低了10%冷却能耗
Reduced cooling energy consumption by 10%

收率提升1.5%，产品竞争力提升
Yield increased by 1.5%, and product competitiveness improved

Himile Continuous Production Process Advantage
豪迈连续化生产工艺优势

硝化反应
Nitrification
1500t/a

传统釜式工艺
Traditional Kettle Process

液液非均相，传质要求高
Liquid-liquid heterogeneous, high-mass transfer requirements

前期反应放热量大
难控温
Large heat release and difficult temperature control in beginning reaction process

后期反应速度慢
副产多，选择性差
Low reaction rate and more by-products with poor selectivity in later reaction process



配套耐腐蚀性材料完成高温混酸硝化
Complete high temperature mixed acid nitration of supporting corrosion-resistant materials

传热系数高，温度控制精准
High-heat transfer coefficient, precise temperature control

设备占地小，产能调整灵活
Small land occupation, flexible capacity adjustment

多产品共用平台
Shared the platform for multiple products

在线量小，本质安全
Small online volume, intrinsically safe

Himile Continuous Production Process Advantage
豪迈连续化生产工艺优势

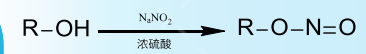
固液硝化
Solid-liquid Nitration
13000t/a

传统釜式工艺
Traditional Kettle Process

人工投固体料
工艺危险
Dangerous process for manual solid feed

难控温
Difficult temperature control

选择性遇到瓶颈
Low yield rate



连续固液硝化
Continuous solid-liquid nitration

自研固体高精度连续进料装置
Self-developed high precision continuous solid feeding device

温度调节控制精准
Precise temperature control

主产物收率提升了5%
5% yield enhancement for main product

放大效应小，在线量小本质安全设备
Small amplification effect, small online volume, intrinsically safe equipment

Himile Continuous Production Process Advantage
豪迈连续化生产工艺优势

硝化反应
Nitrification
6000t/a

传统釜式工艺
Traditional Kettle Process

局部难控温
Difficult local temperature control

收率遇到瓶颈
Yield bottleneck



小试到工业化无缝放大
Seamless amplification from trial testing to industrial production

生产能耗低
Low production energy consumption

在线量小，本质安全
Small online volume, intrinsically safe

产品生产效率提高，通量大
Improved production efficiency, larger flow volume

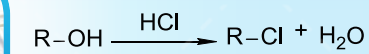
Himile Continuous Production Process Advantage
豪迈连续化生产工艺优势

氯化反应
Chlorination Reaction
26000t/a

传统釜式工艺
Traditional Kettle Process

强酸性氯化取代工艺
通量要求高
Higher-flow requirement of strong acid chlorination substitution process

反应难控
Unmanageable response



匹配特材设备，耐腐蚀性好
Match special material equipment, good corrosion resistance

在线混合反应彻底
On-line mixed reaction thoroughly

实现连续反应、连续分离
Achieve continuous reaction and continuous separation

设备占地面积小
Small land occupation

在线量小，提升生产的安全性
Small online volume, improved safety of production

Himile Continuous Production Process Advantage
豪迈连续化生产工艺优势

过氧化反应
Peroxidation
8000t/a

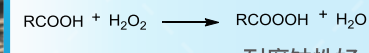
传统釜式工艺
Traditional Kettle Process

放热剧烈

难控温

难放大

Intense heat release, difficult to control temperature and amplification



耐腐蚀性好
Good corrosion resistance

无金属残余，产物稳定
No metal residue, stable yield

连续化生产，连续使用，在线量小
Continuous production, continuous use, small online volume

催化剂连续化套用，降低成本
Continuous application of catalyst, cost reduced

双氧水利用率高，提升安全生产
High utilization rate of hydrogen peroxide, safety production improved

Himile Continuous Production Process Advantage
豪迈连续化生产工艺优势

硝化反应 Nitrification 15000t/a

传统釜式工艺

难放大
选择性差
控不住温
Difficult amplification,
low yield rate,
weak temperature control



混合后升温引发效率高
转化率高, 引发后控温稳定
High efficiency, high conversion rate and
stable temperature control after heating

无冲料风险, 安全生产
No punching risk, safe production

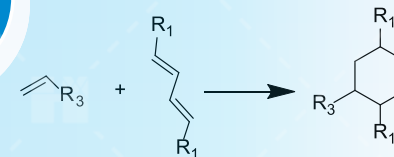
连续化生产, 产品性能稳定
Continuous production, stable product performance

占地面积小, 投资小
设备灵活性高
Small land occupation, low investment,
high flexibility for small equipment

Himile Continuous Production Process Advantage
豪迈连续化生产工艺优势

加成反应 Addition Reaction 4000t/a

豪迈连续化生产工艺优势



混合后升温引发效率高, 转化率高, 引发快, 温度控制稳定
The heating after mixing has high initiation efficiency, high conversion rate, fast initiation
and stable temperature control

无需低温介质换热, 降低能耗
Low temperature medium heat transfer is not required to reduce energy consumption

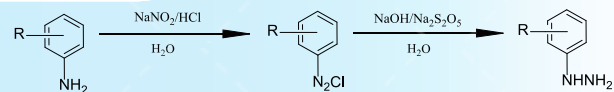
无冲料风险, 安全生产质量稳定
No punching risk, safe production and stable quality

占地面积小, 投资小
Small land occupation, low investment



重氮化反应 Diazotization 2000t/a

豪迈连续化生产工艺优势



满足GMP清洁认证要求, 符合药用规范特材金属材质,
耐腐蚀优异
Meet the requirements of GMP cleaning certification, in line with medicinal specifications of
special metal material, excellent corrosion resistance

占地面积小, 设备体积小, 仅15L
Small land occupation, small equipment size with only 15L

控温准确
Accurate temperature control

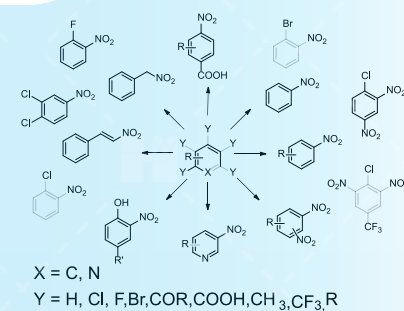
可灵活批量化生产, 批次产品稳定性高
Flexible batch production, batch product stability high



硝化反应 Nitrification

豪迈连续化生产工艺优势

部分百吨、千吨、万吨级别工艺产品
Partial products of hundred tons, thousand tons,
ten thousand tons' process





DMC加压精制塔
DMC pressure refining tower



环氧丙烷装置一效蒸发塔
Propylene oxide unit First-effect evaporation tower



酸性气体吸收塔
Acid gas absorption tower



双氧水装置 氢化塔、萃取塔
Hydrogen peroxide unit:
Hydrogenation tower, Extraction tower



用于CARIOCA MV-30 FPSO 上的CO₂处理模块
CO₂ Treatment Module for CARIOCA MV-30 FPSO



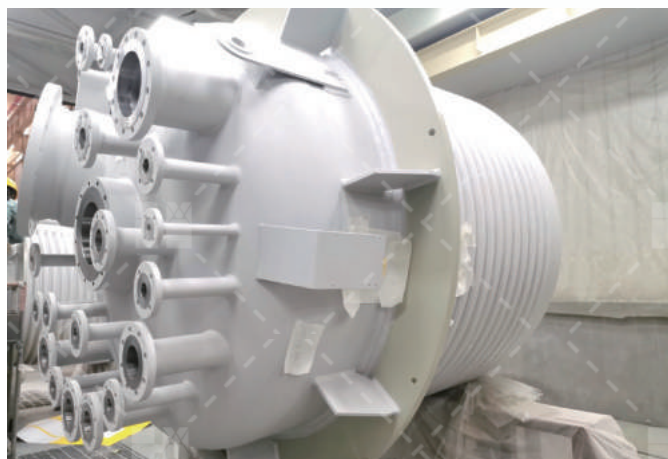
用于 MERO3 FPSO 上的CO₂ 隔膜罐模块
CO₂ Membrane skid package for MERO3 FPSO



TEG 撬块
TEG Skid

豪迈为搅拌需求提供一站式解决方案 PROVIDE ONE-STOP SOLUTION FOR STIRRING

- ①丰富的现场数据与CFD流体仿真相结合，提供更高效率的搅拌方案。
 - ②对搅拌结构进行强度、刚度、疲劳、临界转速、动力学分析，解决复杂的力学问题。
 - ③专业的磁力密封设计，对结构、扭矩、涡流损耗、散热需求等进行严格计算，保证设备安全可靠。
 - ④拥有搅拌实验室，将理论与实践相结合，更好的解决疑难问题。
- ①Rich on-site data combining with CFD fluid simulation, to provide more efficient stirring solution.
- ②The strength, stiffness, fatigue, critical speed and dynamics of stirring structure are analyzed to solve complicated mechanical problems.
- ③Professional magnetic sealing design, strict calculation of structure, torque, eddy current loss, heat dissipation requirements, etc, to ensure that equipment is safe and reliable.
- ④With stirring lab, combining theoretical research with practice to better solve difficult problems.



聚合物反应釜
Polymer reactor



搅拌动平衡测试
Stirring balance test



酯化反应器
Esterification reactor



哈氏合金 (NS3304) 反应釜，应用于腐蚀反应工艺
Hastelloy (NS3304) reactor, mainly for corrosion reaction process

2019年豪迈产品全面进入多晶硅领域，为其专业设计并制造高效热交换器、还原炉、还原炉尾气夹套管换热器、还原炉工艺系统模块、特材换热器和设备、反应器等产品。

豪迈最早在多晶硅行业进行将高效换热器开发及应用，基于高效换热器本身节能的优势，新形式的引进大幅度降低多晶硅的生产成本，延长设备维护及更换周期，提高相关装置运行稳定性；目前豪迈在多晶硅领域设计使用高效换热器的数量及稳定运行周期位于国内首位；基于集团公司机加工优势豪迈对还原炉及其配套的系统工艺进行了深入研究，并与国内外行业专家交流，结合国内还原炉实际运行的情况及存在的问题，进行了优化设计，对24对棒、40对棒、45对棒、48对棒、60对棒、72对棒还原炉进行CFD流场和温度场模拟，由于豪迈具备独特的技术及工程经验，进一步提高还原炉各项性能指标。

In 2019, Himile's products fully entered the polysilicon sector, for which it professionally designs and manufactures high-efficiency heat exchangers, CVD reactor, jacketed pipe heat exchangers for CVD reactor tail gas, CVD reactor process system modules, special material heat exchangers and equipment, reactors, and other products.

Himile was among the first enterprises in the polysilicon industry to develop and apply high-efficiency heat exchangers. Leveraging the inherent energy-saving advantage of high-efficiency heat exchangers, the introduction of this new type of equipment has significantly reduced the production cost of polysilicon, extended the equipment maintenance and replacement cycle, and enhanced the operational stability of relevant devices. Currently, Himile ranks first in China in terms of both the number of high-efficiency heat exchangers designed and used in the polysilicon field and their stable operation cycle.

Based on the group's machining advantages, Himile has conducted in-depth research on CVD reactor and their supporting system processes. It has also exchanged insights with domestic and foreign industry experts, and carried out optimized designs by integrating the actual operation conditions and existing issues of domestic CVD reactors. Himile has performed CFD (Computational Fluid Dynamics) simulations on the flow field and temperature field of CVD reactors with 24-pair rods, 40-pair rods, 45-pair rods, 48-pair rods, 60-pair rods, and 72-pair rods. Thanks to its unique technological and engineering experience, Himile has further improved various performance indicators of the CVD reactors.



冷氢化换热器
Cold Hydrogenation Heat Exchanger(DN1400×6600S31608)



CVD气相沉积还原反应器
CVD Vapor Deposition Reduction Reactor(Q345R+HC-276/S31603)



多晶硅还原炉撬块
CVD Reactor Skid



还原炉反应器生产车间
CVD Reactor production workshop

08

愿景/使命

HIMILE VISION/ MISSIONS

愿景 VISION

成为一流公司

TO BECOME ONE OF THE LEADING COMPANIES

使命 MISSION

成为员工实现梦想的平台

成为中国企业转型升级的领跑者

成为民族品牌的骄傲

TO BECOME A PLATFORM FOR EMPLOYEES TO REALIZE THEIR DREAMS

TO BECOME A TRANSFORMING AND UPGRADING FORERUNNER AMONG CHINESE ENTERPRISES

TO BECOME THE PRIDE OF NATIONAL BRANDS

09

合作伙伴

MAJOR CUSTOMERS

