MAGNETIC PLASMA REACTOR

磁场耐电等离子热裂分解炉

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Albert Teo

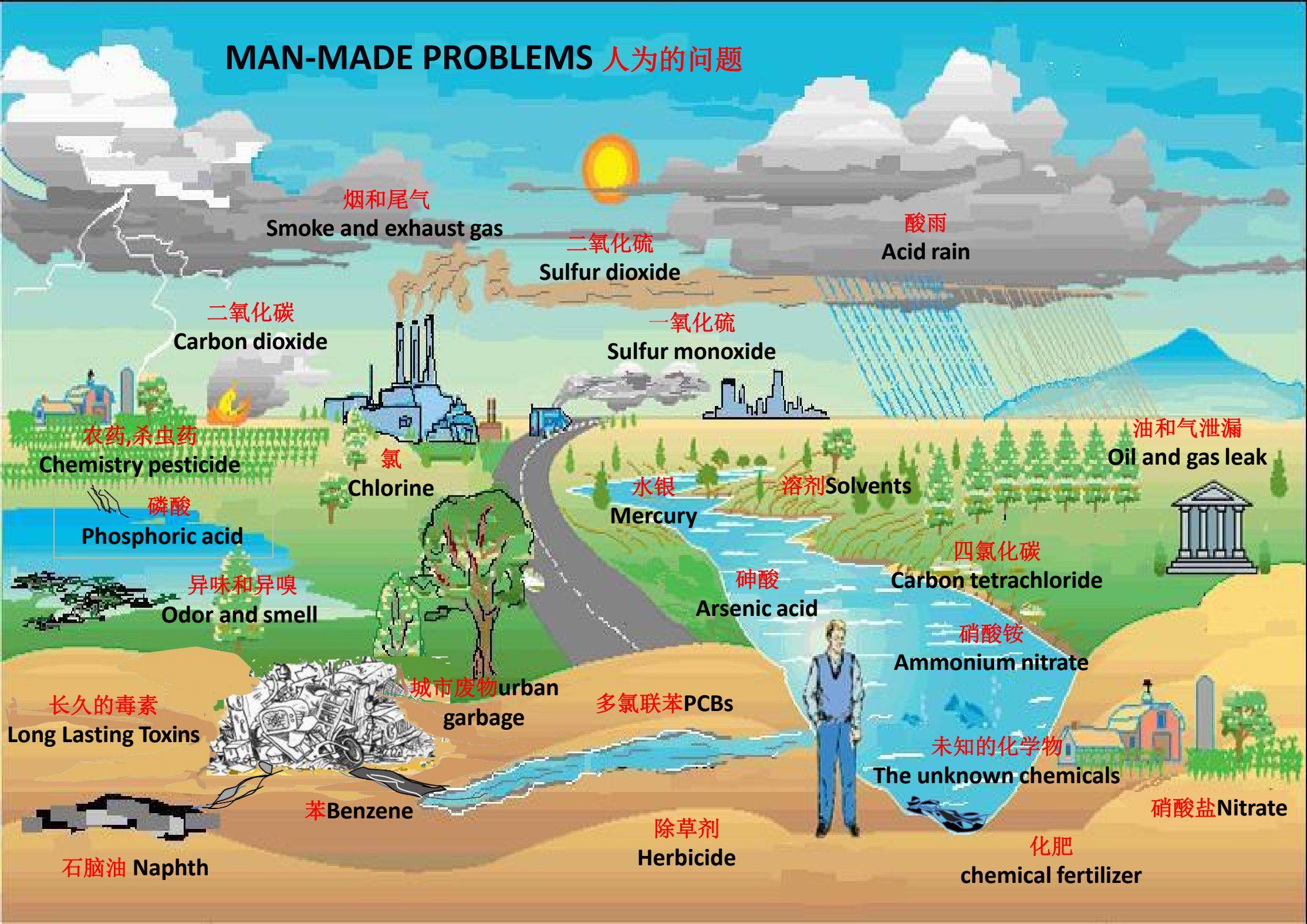
WMRAS
Waste Management & Recycling Association of Singapore

MEMBER
Water Quality Association

SWA
Singapore Water Association

IWA International Water Association

2007 FROST & SULLIVAN


MAN-MADE PROBLEMS 人为的问题
烟和尾气
Smoke and exhaust gas
二氧化硫
Sulfur dioxide
酸雨
Acid rain
二氧化碳
Carbon dioxide
一氧化硫
Sulfur monoxide
农药,杀虫药
Chemistry pesticide
氯
Chlorine
油和气泄漏
Oil and gas leak
水银
Mercury
溶剂Solvents
磷酸
Phosphoric acid
四氯化碳
Carbon tetrachloride
异味和异嗅
Odor and smell
砷酸
Arsenic acid
硝酸铵
Ammonium nitrate
城市废物urban garbage
长久的毒素
Long Lasting Toxins
多氯联苯PCBs
未知的化学物
The unknown chemicals
苯Benzene
硝酸盐Nitrate
除草剂
Herbicide
石脑油 Naphth
化肥
chemical fertilizer

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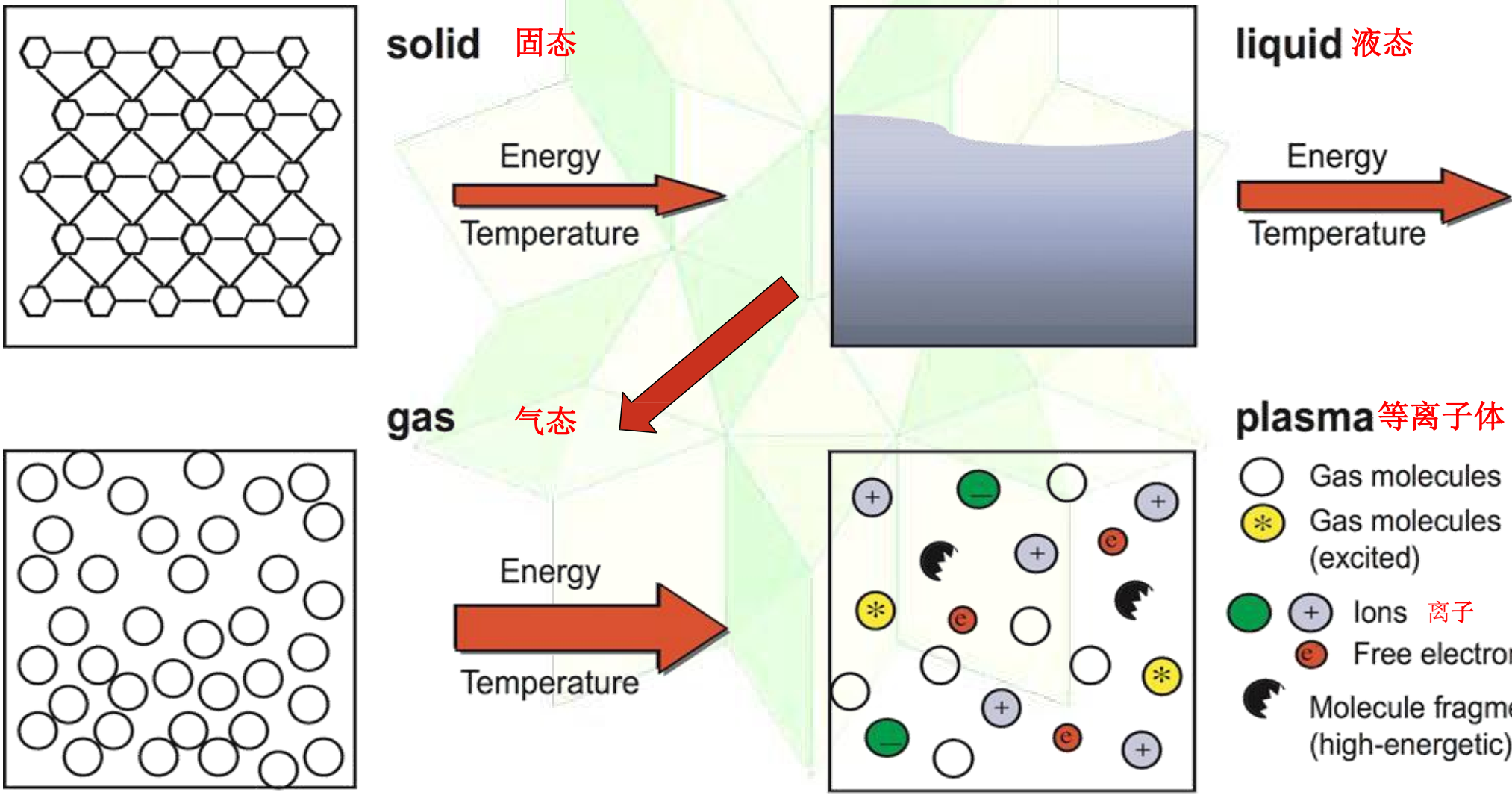
PLASMA TECHNOLOGY INTRODUCTION
磁场耐电等离子热裂分解炉技术介绍

- Plasma technology is based on a simple physical principle. Matter changes its state when energy is applied to it: solids becomes liquid, and liquids becomes gaseous. If even more energy is applied to a gas, it is ionized and goes into the energy-rich plasma state, the fourth state of matter.
- 等离子体技术是基于一个简单的物理原理, 物质能量应用时更改其状态, 固体变成液体, 液体变成气体, 如果更多的能量用于气体, 它是电离和进入能源丰富的等离子体状态, 等离子体是第四个物质状态.
- Natural Plasma can be seen in Lightning, Sun, Stars, Comet, etc..
- 天然等离子体中可以看到闪电,太阳,星星,彗星,等...
- Plasma Technology used by NASA since 1960 and become more popular.
- 等离子体技术自1960年以来, 一直由美国国家航空航天局所使用随后成为更受欢迎产品

等离子概念定义是随着能量输入的增加，物质的状态会发生变化，从固态到液态，再到气态。如果采用放电的方式再向气体增加能量，气体将转变为等离子体。

As the energy input increases, the state of the material changes from solid state to liquid state, and then to gaseous state. If the discharge is used to increase the energy to the gas, the gas will be transformed into a plasma.



热力学平衡，简称热平衡，指一个热力学系统在没有外界影响的条件下，系统各部分的宏观属性（如物质的量、能量、体积等）在长时间内不发生任何变化的状态，热平衡是热力学中的一个基本实验定律，其重要意义在于它是科学定义温度概念的基础，是用温度计测量温度的依

Thermodynamic equilibrium, referred to as thermal equilibrium, refers to a thermodynamic system in the condition of no external influence, the macroscopic properties of each part of the system (such as the amount of matter, energy, volume, etc.) in a long time without any change in the state.

按照热力学平衡分类：

热等离子体

B

Te = Ti，Tg，

即局部热力学平衡等离子体，如电弧等离子体、高频等离子体。

高温等离子体

完全热力学平衡等 离子体：太阳内部、 核聚变、激光聚变。

A

低温等离子体 ← 10000℃ ← 高温等离子体

冷等离子体

C

Te≠ Ti，Tg，

即非热力学平衡等离 子体，如：电晕放电、 辉光放电、介质阻挡放电、火花放电、微波放电、射频放电。

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Introduction to plasma gasification technology
等离子气化技术简介

As the temperature rises in the chamber, the atoms of the gas molecules split into separate Atoms (the Nitrogen molecules split into Nitrogen Atoms). This process is called dissociation of the gas molecules. With temperature rise further, the Electrons of the Atoms spun off from the Atom, form a Positively Charged Nucleus and Negatively Charged Electrons, the Atomic Ionization. This process is called frequently when Ionization process, make the electrons and ions concentration reaches a certain value, the status of the fundamental change occurs, nature becomes totally different from gas. Different from solid, liquid and gas of the three state of this state called the fourth state of the material - Plasma

在裂解炉中随着温度不断升高,气体分子的原子发生分裂,形成为独立的原子(氮分子会分裂成氮原子),这个过程称为气体分子的离解;随着温度进一步升高,原子中的电子就会从原子中剥离出来,形成带正电荷的原子核和带负电荷的电子,这个过程称为原子的电离.当电离过程频繁发生,使电子和离子的浓度达到一定的数值时,物质的状态发生根本变化,性质变得与气体完全不同.有别于固体,液体和气体这三种状态的这种状态称为物质的第四态--等离子

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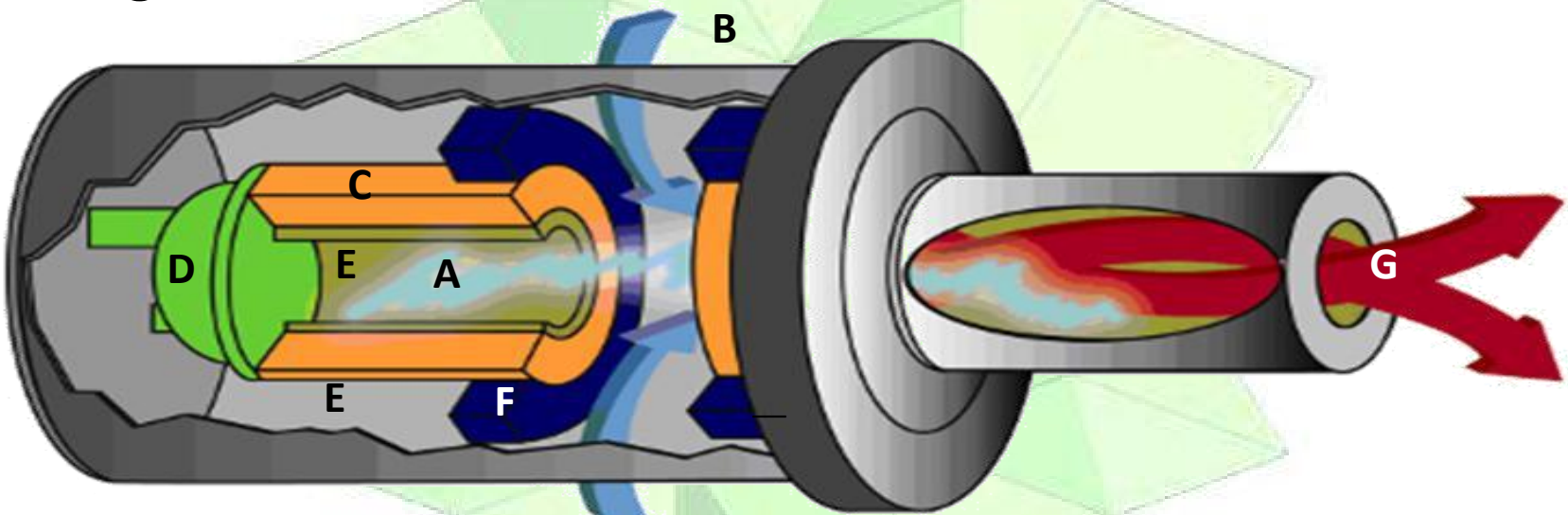
Plasma generation for waste management

3 main generation mechanisms 三种主要生成机制

1. Arc plasma based discharge 基本电弧等离子放电体
2. Radio-frequency induction (RFI discharge) 射频感应(RFI放电)
3. Magnetic Plasma 磁场等离子体



A 等离子体柱 Plasma Column

B 气体进入处理过程 Entering Process Gas

C 电磁场 Magnetic Field

D 电力终端 Power Terminals

E 石墨电极 Electrodes

G 加热过程气体 Heated Process Gas

F 冷却水岐管 Cooling Water Manifold

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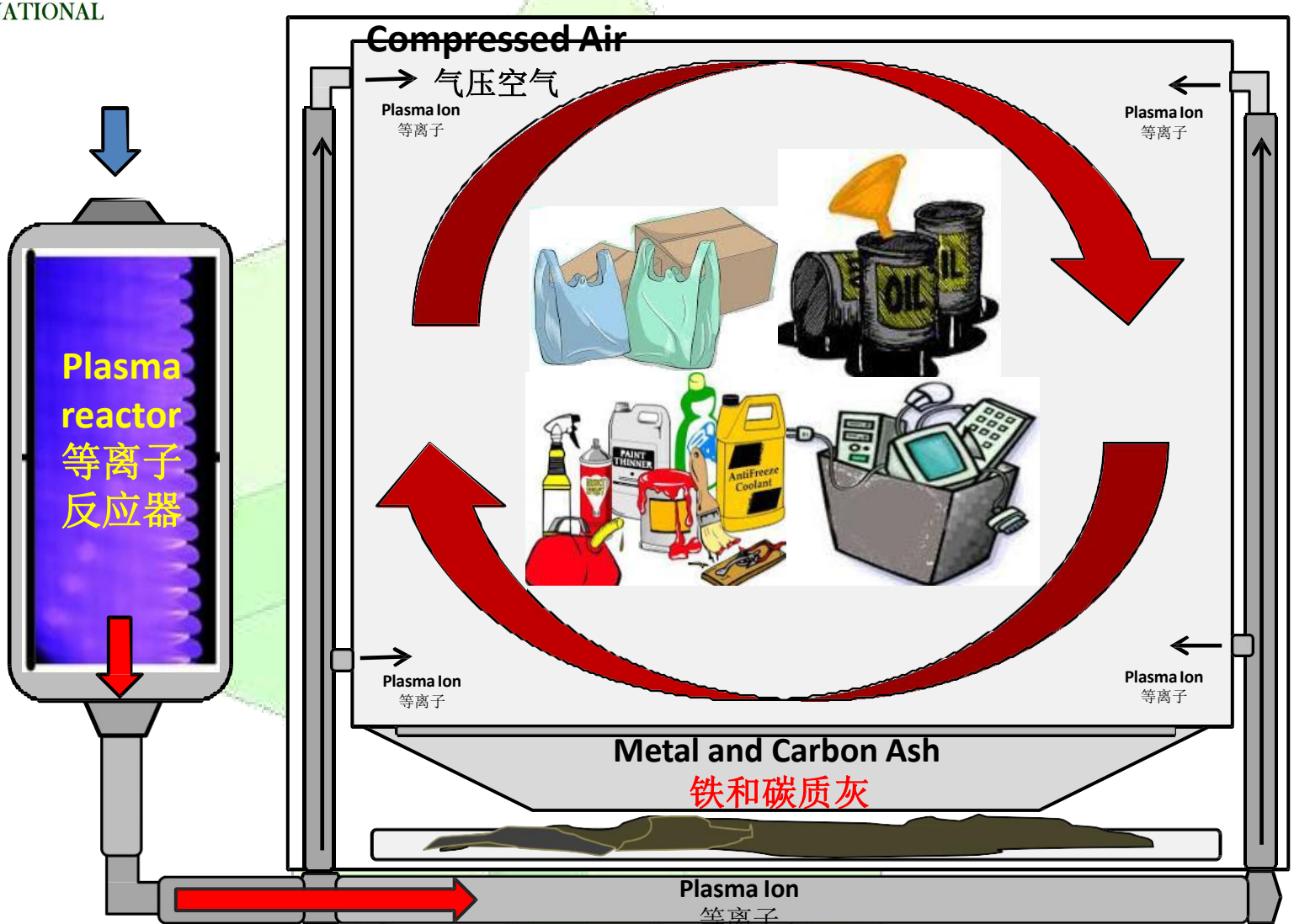
Low Temperature Plasma
低温磁场耐电等离子热裂分解炉体

Plasma Energy Conversion Device
等离子能量转换设备



WORK FLOW INSIDE MAGNETIC PLASMA REACTOR

磁场耐电等离子热裂分解炉内部工作流程

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WHAT IS A MAGNETIC PLASMA REACTOR

什么是磁场耐电源频率等离子裂解炉

- A device that uses plasma technology to convert all municipal waste and organic waste to concentrated recyclable ion ceramic ash. The ash can be used back for construction of roads and buildings.
- 利用等离子体技术将所有城市垃圾和有机废物转化为集中回收离子陶瓷灰。火灰可回用于建设公路和建筑物。

- The system operates at high temperature in the absence of oxygen. It uses magnetic field to generate negative and positive ions to break down all organic matters. Any inorganic matters such as metal, glass, sand etc will be segregated and drained out from the bottom of the system as slag.
- 系统在高温缺乏氧气之内运行。系统使用磁场耐电源频率产生正负离子分解有机物质， 任何无机事项如金属， 玻璃, 沙等将隔离, 从底部的排渣系统排离出

(a) Plasma pyrolysis: Thermal breakdown without oxidation
等离子热裂解:无氧化的热击穿
(b) Plasma gasification: Incomplete oxidation of waste and generation of combustible gas (syn-gas)
等离子气化:废物的不完全氧化和可燃气体(合成气)的生成
(c) Plasma compaction and vitrification: Gasifying and melting to bind hazardous materials in a ceramic matrix
等离子体压实和玻璃化:在陶瓷基体中气化和熔融结合有害物质

- Magnetic plasma reactor produces ecologically clean waste.
磁等离子体裂解反应器生生产出清洁生态垃圾.

APS等离子裂解炉是最绿色清洁和可持续的解决方

The Alpha Magnetic Plasma system is a green and sustainable solution

alpha process solutions

Introduction For Plasma Pyrolysis Thermal Decomposition Technology

等离子裂气化技术简介

APS等离子裂解炉采用3室炉及多孔介质结构，利用在多孔介质气体过滤过 程中加热起始材料并形成过滤燃烧，引发反应物与释放热量的化学反应, 先将空气与水蒸气混合物作为气态氧化剂，以超绝热燃 烧和过滤燃烧模式，上部腔室在富氧环境下加热炉排上固废，其 中有机物热解，生成 C、H_2、CO、H_2O、CH_4、CnHm等可燃 气体，由排气口搜集，滤除水分。上部膛室借助于风机再循环经 过循环烟气管道，并在炉篦下方进入下膛室，以将炉篦上的有机 物混合发生氧化反应（焚烧），并且通过等离子裂热解+焚烧使固废气化，从 而能够实现含水量达80%的固废完成99%的气化目标。低温磁场等离子体熔融气化技术代表了当今特种危险废物集中 处理领域最前沿的发展方向，噪音低, 零排放, 无污染, 无需外, 部资源，成功实现了固废, 危废的资源化, 减量化和无害化高效 处理。

APS plasma pyrolysis furnace adopts 3 chamber furnace and structure of porous media, used in heating in the porous medium gas filter starting material and forming filter burning, cause the reactants and heat of chemical reaction, mixture of air and water vapor as a gaseous oxidizing agent, first to burn and filtering superadiabatic combustion combustion mode, the upper chamber furnace in oxygen-enriched environment on solid waste, the pyrolysis of organic matter in the generated C, H2, CO, H2O, CH4 and CnHm combustible gas, by a vent to collect, filter out the moisture.The upper chamber circulates through the circulation flue gas pipeline with the help of the fan, and enters the lower chamber under the grate to mix the organic matter on the grate for oxidation reaction (incineration), and solidifies the exhaust gas through plasma crack

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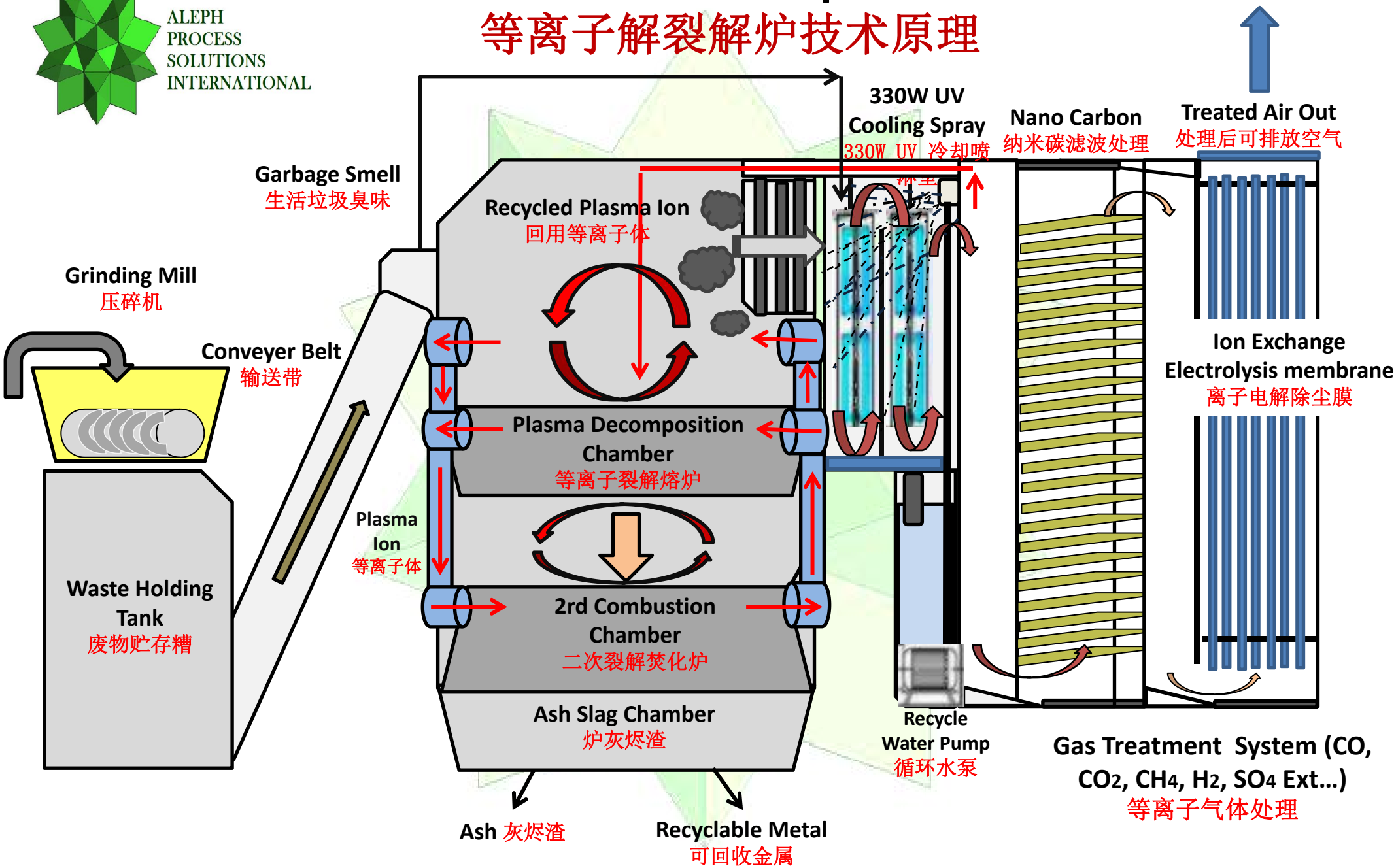
Plasma Technical Principle Treatment

等离子解裂解炉技术原理



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MAGNETIC PLASMA REACTOR AIR EMISSION

APS磁场等离子固/危气化热裂分解技术炉的空气排放

Magnetic Plasma System is a Pyrolysis Heat Source, rather than the traditional use of gas or fuel ignition combustion, the Magnetic Plasma gas has the advantage of producing High Intensity Heat Source (400º-1200º C), and the operation is relatively simple as long as a small amount of electricity is used.

磁场等离子气化为裂解热源, 而不是传统的利用燃气或燃油点火燃燒, 磁场等离子气体有着能产生高強度热源的优势 (800º-1500ºC), 而且操作相对简单只要用少量的电能.

Pyrolysis Chamber Charging Plasma is a kind of High Energy, due to its High temperature and High density can be almost completely gasification the Solid Waste Organic and Chemical material into syngas (mainly for the CO, H2), Most Dangerous Waste and Medical Waste after the Normal Pressure and High Temperature Magnetic Plasma thorough will all Decomposition, for Polychlorinated and Dioxins gas is efficiency as high as 99.999% will be Annihilate, while inorganic metal and glass can reuse and recycle.

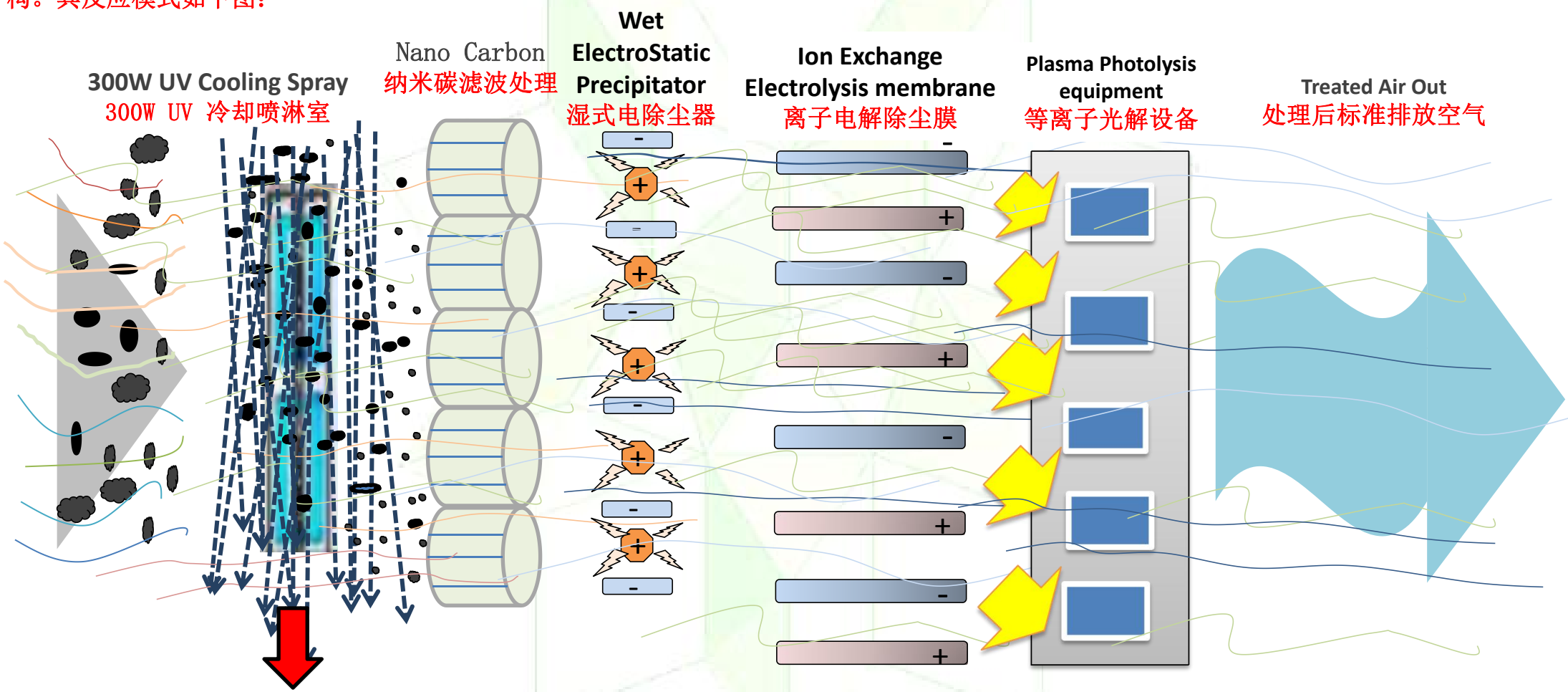
裂解炉的等离子体是一种充电高能量气体, 由于其高温和高热密度几乎能將固体废物中的有机物和化学物资完全气化成合成气 (主要为CO, H2), 危废和医疗危废物在经过常压力和高温磁场等离子体处理后彻底销毁, 摧毀多氯联笨和二恶英等的效率高达99.999%, 而无机物金属和玻璃体则可回用回收.

After purification, the synthetic gas is filtered and desulfurized, and the clean gas is mainly composed of hydrogen, carbon monoxide, carbon dioxide, nitrogen, amount of water vapor. The equipment releases almost No Dust, No Sulfur Dioxide, No black Carbon Smoke, No Nitrogen Oxides, and almost 99.999% with Zero Emission Standard

合成气体经净化过气体过滤和脱硫后处理清洁气体主要由氢, 一氧化碳, 二氧化碳, 氮气, 少量水蒸气, 设备向大气排放几乎沒有粉尘, 沒有二氧化硫,沒有黑碳烟, 沒有氮氧化物, 几乎达零排放标准99.999%

Plasma Gas Treatment　等离子尾气体处理

APS磁场等离子固/危气化裂解技术基本原理是将待处理废弃物的分 子分离成基本的元素粒子，再将这些元素重新组合成无害的、可利用的化合物，其兼具高能电子辐射、臭氧氧化、紫外光分解三种作用于一体，从而使得各类特种危险废物达到零排放、无污染的效果， 从而形成对环境的重要保护作用。决定这种燃烧特性的关键是气体 过滤，它不仅作为化学反应的参与者，还作为冷却剂，形成双温度 燃烧波的热结构。其反应模式如下图：



燃料 + 氧化剂(g) + 惰性组分(s,g) = 产品(s,g) + 惰性组分(s,g)

- s是凝相，g是气相；
- 产品是热能和水；
- 惰性组分是不参与氧化和气化反应的气体和冷凝物质，包括空 气氮、固体燃料灰分等。

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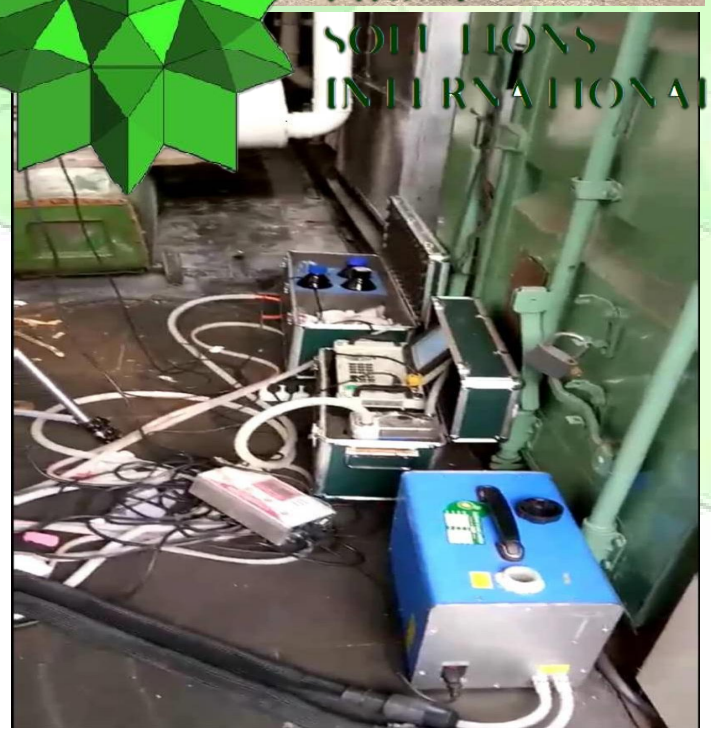
MAGNETIC PLASMA REACTOR AIR EMISSION
磁场耐电等离子热裂分解炉的空气排放

Specifications 技术参数

- Provide means to manage exhaust from process
  提供管理排气过程的方法
- Cascading network of modular exhaust treatment systems
  模块化排气处理系统的层叠网络
- Carbon Nano filter array
  碳纳米过滤数组
- Water filtration suite
  污水过滤套件
- Electrostatic precipitator
  离子静电除尘器
- Plasma Ionization Mesh Array Ion Exchange Electrolysis membrane
  等离子电离网阵列离子交换电解膜
- Optimized operational conditions with system fully functioning in tandem allows for no odour, no toxic gaseous byproducts, no PM 2.5 emissions
  优化的操作条件，系统充分发挥作用，没有气味，没有有毒气体副产品，没有PM 2.5排放
- Effective SO_x and NO_x management
  有效的SO_x和NO_x管理
- Experimental tests show no dioxins left in by products
  实验测试表明，副产品中没有二恶英残留

尾气检测现场 Smoke Witnessed Inspections



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尾气检测现场 Smoke Witnessed Inspections

91 等离子裂解炉烟尾气化实验监测数据（板框压滤 18.11.19. 13:30）

序号	监测项目	监测浓度（ppm）	监测浓度（mg/m3）	排放速率 kg/h	标准限值（mg/m3）	标准来源
1	NO	11	47	0.12	–	危险废物焚烧污染控制标准 GB18484-2001
2	NO_2	0.2	1	0.00	–	
3	NO_X	11	47	0.12	500	
4	CO	4	11	0.03	80	
5	SO_2	3	18	0.05	300	
6	O_2	16.24	–	–	–	
7	烟温T	29℃				
8	流速	2.2m/s				

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备注：基准氧含量11%；排气筒D=150mm

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MAGNETIC PLASMA REACTOR AIR EMISSION
磁场耐电等离子热裂分解炉的尾气排放

- Below are the air emission composition from Japan (source retrieved from reactor chamber):
- 下面是空气排放成分(源从等离子裂解炉检索室)

TYPE 类型	UNIT 单位	RESULT 结果	STANDARD VALUE 标准参数值
Dioxin density in flue gas 在烟气二恶英密度	Ng-TEQ/m³ (0°C, 101.3kPa)	0.01	<5
Dioxin density during combustion 在燃烧二恶英密度	Ng-TEQ/m³ (0°C, 101.3kPa)	0.068	<3
CO density 一氧化碳浓度	ppm (02-12% conversion)	1.25-1.75	<30
Oxygen density 氧气的密度	%	<10	-
Fly ash density PM2.5 煤粉灰密度	g/m³N (02-12% conversion)	<0.009	<0.15
Hydrogen chloride density 氯化氢密度	ppm (02-12% conversion)	<5	<430
Sulphur oxide density/volume 硫氧化物密度/体积	Ppm/m³N/h	<2<0.001	-
Nitrogen oxide density 氧化氮密度	ppm (02-12% conversion)	<0.03-0.05	<250

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MAGNETIC PLASMA REACTOR AIR EMISSION

磁场耐电等离子热裂分解炉的尾气排放

PONY
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检 测 报 告

报告编号：MMB[illegible]　　第 6 页，共 10 页

委托单位	武汉艾义法德环保科技有限公司		
项目名称	垃圾等离子裂解处理试验项目		
受测地址	荷兰花市小镇（月亮湾大道 3008 号）		
采样日期	2018.10.08	完成日期	2018.11.19
排气筒名称	裂解炉尾气排气引导筒排放筒	标态干废气流量(m^3/h)	518
排气筒高度(m)	2	废气平均温度(℃)	29
大气压(kPa)	101.0	废气平均流速(m/s)	2.2
采样位置	净化后	净化器厂家/名称/型号	——
样品编号	M09379555-1~4	净化方式	含尘、油烟气加湿降温高压电捕收集
检测方法	详见附表		
采样仪器	自动烟尘测试仪		

检测项目	检测结果	
	排放浓度	排放速率（kg/h）
二氧化硫	68（mg/m^3）	0.042
一氧化碳	72（mg/m^3）	1.68
二氧化氮	26（mg/m^3）	
二恶英类	0.089（ngTEQ/Nm^3）	
PM2.5	11.19 / 25.15（$\mu g/m^3$）	
PM10	18 / 38（$\mu g/m^3$）	

PONY 谱 尼 测 试 Pony Testing International Group
Hotline 400-819-5688　www.ponytest.com

PONY
Pony Testing International Group

检 测 报 告

报告编号：MMBA[illegible]　　第 7 页，共 10 页

排气筒名称	裂解炉尾气排气引导筒排放筒	标态干废气流量(m^3/h)	518
排气筒高度(m)	2	废气平均温度(℃)	29
大气压(kPa)	101.0	废气平均流速(m/s)	2.2
采样位置	净化后	净化器厂家/名称/型号	——
样品编号	M09379555-1~4	净化方式	含尘、油烟气加湿降温高压电捕收集
检测方法	详见附表		
采样仪器	自动烟尘测试仪		

检测项目	检测结果	
	排放浓度	排放速率（kg/h）
臭气浓度（无量纲）	22.5（mg/m^3）	
氯化氢	2.2（mg/m^3）	
总有机碳	8.5（mg/m^3）	
氮氧化合物	220（mg/m^3）	
铅	0.01（mg/m^3）	
汞	0.016（mg/m^3）	
其他重金属	0.09（mg/m^3）	
铜:铅及其化合物	0.045（mg/m^3）	

PONY 谱 尼 测 试 Pony Testing International Group
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MAGNETIC PLASMA REACTOR AIR EMISSION

磁场耐电等离子热裂分解炉的尾气排放

SGS

Report No. : 2017-01575 / 001-1 (Page 1 of 1) Issued date : January 15, 2018

PROJECT DEVELOPER : THAI ENVIRONMENT SYSTEMS LTD., PARTNERSHIP
PROJECT CONSTRUCTOR : ALPHA PROCESS SOLUTIONS (THAILAND) CO., LTD.

ADDRESS : No. 32, Rama 2 Road, Thakham, Bangkhuntien, Bangkok 10150

Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Infectious Waste Incinerator Stack
SAMPLING DATE : November 24, 2017
SAMPLING TIME : 14.00 -16.00 hrs.

Parameters	Units	Values	Standard[1]	Analytical Methods
Stack Diameter	mm	120	-	-
Stack Temperature	°C	120.3	-	-
Dry Gas Temperature	°C	32.8	-	-
Absolute Stack Pressure	mm.Hg	756.1	-	-
Air Velocity	m/s	8.89	-	U.S.EPA Method 2
Volumetric Flow Rate	Nm³/hr	10,419	-	
Oxygen (O_2)	%	17.13	-	U.S.EPA Method 3
Carbon Dioxide (CO_2)	%	2.90	-	
Moisture	%	17.39	-	U.S.EPA Method 4
Opacity	%	0.0	10	Ringlemann's Method
Total Suspended Particulates (TSP)	mg/Nm³	1.44	120	U.S.EPA Method 5
Sulfur Dioxide (SO_2)	ppm	N.D.	30	U.S.EPA Method 6
Oxide of Nitrogen (NO_x)	ppm	116.51	180	U.S.EPA Method 7
Hydrogen Chloride (HCl)	ppm	1.36	25	U.S.EPA Method 26A
Hydrogen Fluoride (HF)	ppm	0.04	20	
Mercury (Hg)	mg/Nm³	N.D.	0.05	U.S.EPA Method 29
Cadmium (Cd)	mg/Nm³	N.D.	0.05	
Lead (Pb)	mg/Nm³	N.D.	0.5	

Remarks :
- The concentration of emission air is based on the reference condition at temperature of 25 °C, pressure of 1 atm or 760 mmHg, dry basis and excess oxygen of 7%.
- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mmHg and dry basis.
- N.D.= Not Detected, Detection Limit for SO_2 <2.7 ppm, Hg and Pb<0.001 mg/Nm³ and Cd<0.0006 mg/Nm³

Source : [1] Emission Standard for Infection Waste Stack, Notification of the Ministry of Natural Resources and Environment, dated on December 25, B.E. 2546 (2003).

(Siriporn Imwilaiwan)
Environmental Monitoring Manager

(Thepson Yommana)
Technical Manager

SGS (THAILAND) LIMITED

TY/NT/ND/CJ

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Report No. : 2017-01575 / 001-2 (1 of 3) Issued date : January 15, 2018

PROJECT DEVELOPER : THAI ENVIRONMENT SYSTEMS LTD., PARTNERSHIP
PROJECT CONSTRUCTOR : ALPHA PROCESS SOLUTIONS (THAILAND) CO., LTD.

ADDRESS : No. 32, Rama 2 Road, Thakham, Bangkhuntien, Bangkok 10150

Analysis Report

SAMPLE DESIGNATED AS : Emission Air Quality
SAMPLING LOCATION : Infectious Waste Incinerator Stack
SAMPLING DATE : November 24, 2017
SAMPLING TIME : 09.00 -11.00 hrs.

Parameters	Units	Value	Standards	Analytical Methods
Fuel Type	-	Waste	-	-
Stack Diameter	mm	120	-	-
Stack Temperature	°C	120.3	-	-
Dry Gas Temperature	°C	32.8	-	-
Absolute Stack Pressure	mm.Hg	756.1	-	-
Air Velocity	m/s	8.89	-	U.S. EPA Method 2
Volumetric Flow Rate	Nm³/hr	10,419	-	
Moisture	%	17.39	-	U.S. EPA Method 4
O_2	%	17.13	-	U.S. EPA Method 3
CO_2	%	2.90	-	
Total Dioxin (mass) (at O_2 7%)	ng/Nm³	1.489	-	U.S. EPA Method 23A
Dioxins and Furans (TEQ) (at O_2 7%)	ngTEQ/Nm³	0.0047	0.5[1]	

Remarks :
- TEQ-The value is calculated by using the Toxicity Equivalence Factors (TEF)
- N = Normal condition means reference condition at temperature of 25 °C, pressure of 1 atm or 760 mm.Hg, excess oxygen of 7% and dry basis.
- Analysis by SGS Belgium.

Source : [1] Emission Standards for Infection Waste Incinerators, Notification of the Ministry of Natural Resources and Environment dated on December 25, B.E.2546 (2003).

(Siriporn Imwilaiwan)
Environmental Monitoring Manager

(Thepson Yommana)
Technical Manager

SGS (THAILAND) LIMITED

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MAGNETIC PLASMA REACTOR AIR EMISSION

磁场耐电等离子热裂分解炉尾的气排放

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- Analysis by SGS Belgium.

Source : Emission Standards for Infection Waste Incinerators, Notification of the Ministry
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(Siriporn Imwilaiwan)
Environmental Monitoring Manager

(Thepson Yo
Technical M

SGS (THAILAND) LIMITED

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Parameters 参数	Units 单位	Value 数值	Standards 标准	Analytical method 分析法
Fuel Type 燃料种类	"	Waste 损耗种类	"	"
Stack Diameter 烟囱直径	mm	120	"	"
Stack Temperature 烟囱温度	°C	120.3	"	"
Dry Gas Temperature 燥气体温度	°C	32.8	"	"
Absolute stack Pressure 烟囱压力	mm.Hg	756.1	"	"
Air Velocity 压缩空气压力	m/s	8.89	"	U.S EPA Method 2 美国环境保护署分析法 2
Volumetric Flow Rate 体积流率	Nm^3/hr	10,419	"	
Moisture 空气湿度	%	17.39	"	Method 4 美国分析法 4
Oxygen O_2 氧气	%	17,13	"	U.S EPA Method 3 美国环境保护署分析法 3
Carbon dioxide CO_2 二氧化碳	%	2.90	"	
Total Dioxin(mass)($O_2$7%) 总二恶英 (质量) ($O_2$7%)	ng/Nm^3	1.489	"	U.S EPA Method 23A 美国环境保护署分析法 23A
Dioxin & Furans(TEQ)($O_2$7%) 二恶英及氧茂 (毒性当量) ($O_2$7%)	$ngTEQNm^3$	0.0047	0.5⁄	

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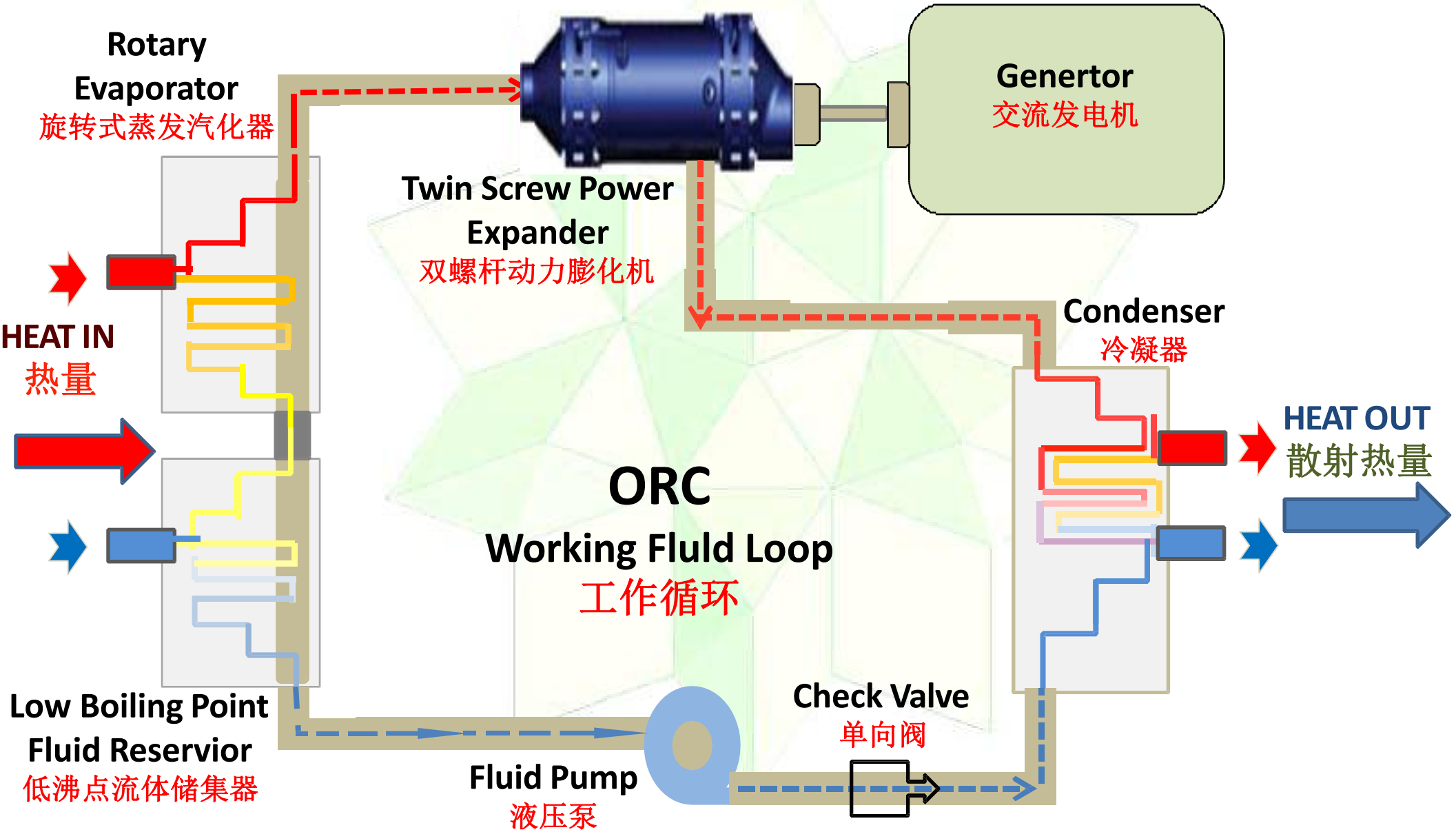
(ORC)Organic Rankine Cycle Generator
有机朗肯循环发电机



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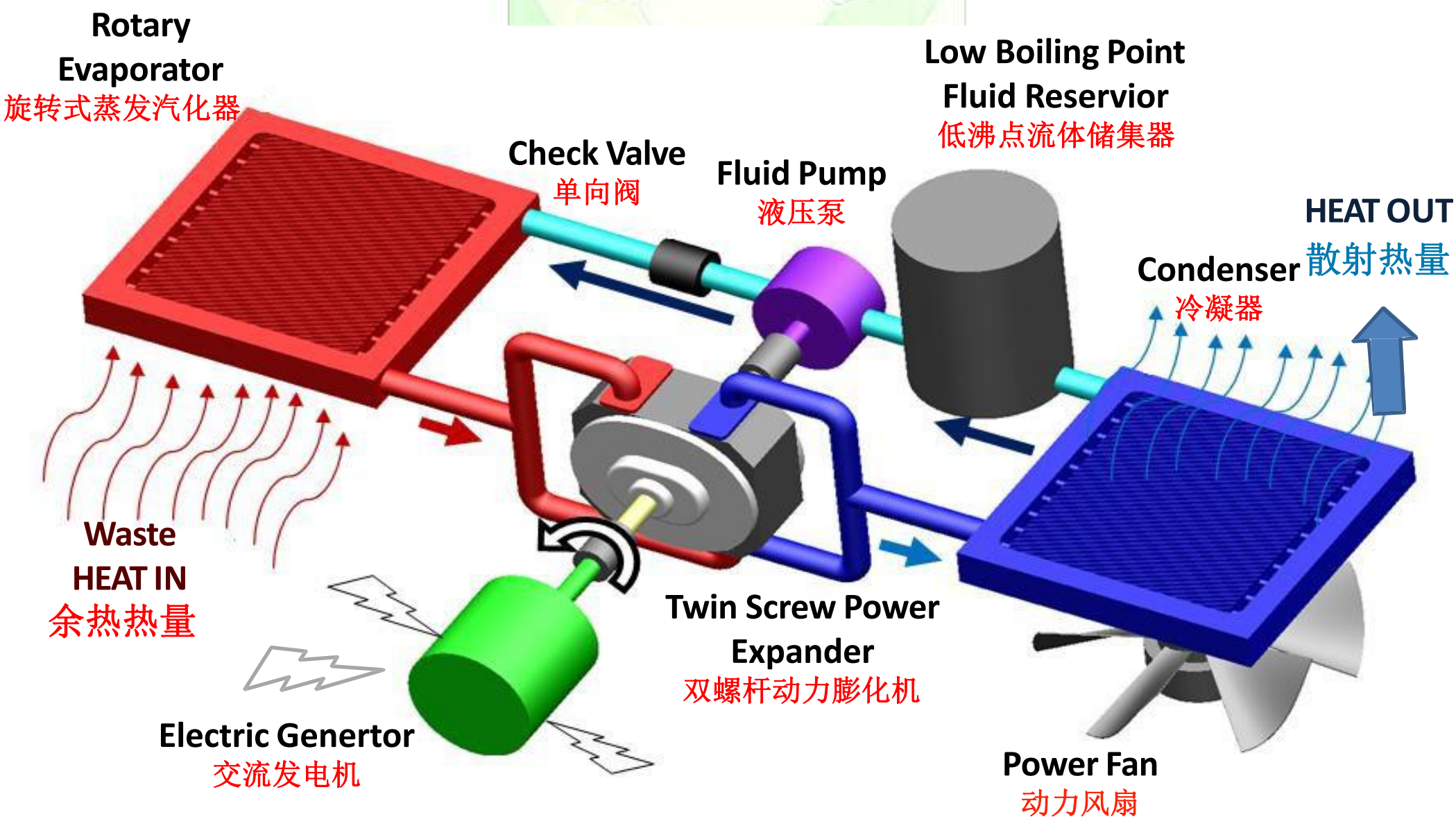
(ORC)Organic Rankine Cycle Generator
有机朗肯循环发电机



(ORC)Organic Rankine CycleGenerator

有机朗肯循环发电机

Organic Rankine Cycle (ORC) is a lonken Cycle with low boiling point organics as working medium. It mainly consists of four sets of waste heat (or heat exchanger), turbine, condenser and working medium pump of plasma cracking furnace. Its working principle is shown in the figure.In the heat exchanger, the organic working medium absorbs heat from the residual heat flow and generates steam with a certain pressure and temperature.The steam discharged from the turbine releases heat into the cooling water in the condenser, condenses into liquid and finally returns to the heat exchanger by means of the working medium pump, so it is continuously circulated.

有机朗肯循环发电机Organic Rankine Cycle，简称(ORC)是以低沸点有机物为工质的朗肯循环，主要由等离子裂解炉的余热 (或换热器)、透平、冷凝器和工质泵四大部套组成，其工作原理如图所示。有机工质在换热器中从余热流中吸收热量，生成具一定压力和温度的蒸汽，蒸汽进入透平机械膨胀做功，从而带动发电机或拖动其它动力机械。从透平排出的蒸汽在凝汽器中向冷却水放热，凝结成液态最后借助工质泵重新回到换热器，如此不断地循环下去。

ORC is a thermodynamic process, its working principle and steam cycle (Rankine's cycle) is the same, the difference is the use of high molecular weight organic liquid instead of water as the working fluid can be in a much lower temperature than water boiling. The 80 °C heat can evaporate and organic fluid displacement dynamic expansion machine and produce high power

也就是说ORC是一种热力学过程,其工作原理与蒸汽循环(朗肯循环)相同, 不同之处在于使用高分子量有机流体代替水作为工作流体可以在比水低得多的温度下沸腾. 使80°C的废热就能够蒸发有机流体并驱争动膨胀机而产生出高电力

Material Balance Calculation
物质平衡计算

The material balance of municipal solid waste pyrolysis is calculated according to the design conditions such as the characteristics of municipal solid waste, pyrolysis furnace type, waste heat utilization mode and environmental protection standard.Typical calorific value of gasified fuel is between 10 and 20 (MJ/kg). The main components are:

城市生活垃圾裂解的物料平衡是根据生活垃圾特性、裂解炉型、余热利用方式、环境保护标准等设计条件来计算。气化燃料的典型热值在10~20(MJ/kg)之间，主要成分为:

- Carbon content 碳含量 40% - 55%
- Hydrogen content 氢含量 5% - 8%
- Nitrogen 氮气 <0.1% - 2%
- Oxygen 氧气 23% - 35%
- Sulfur 硫 <1%
- Chlorine 氯 < 0.1%
- Anseransr灰分 10% - 30%
- Water 水 10% - 30%

Material Balance Calculation

物质平衡计算

The material balance of municipal solid waste pyrolysis is calculated according to the design conditions such as the characteristics of municipal solid waste, pyrolysis furnace type, waste heat utilization mode and environmental protection standard.

城市生活垃圾裂解的物料平衡是根据生活垃圾特性、裂解炉型、余热利用方式、环境保护标准等设计条件来 计算。

收入项 IN PUT			支出项 OUT PUT		
项目 ITEM	数值 t/h	百分比 %	项目 ITEM	数值 t/h	百分比 %
垃圾量 Quantity of refuse	1.2	12.96	排尾气量 Smoke & Air exhaust rate	1.83	97.86
空气 AIR	0.17	86.37	炉渣量 Slag quantity	0.002	0.108
等离子量 Plasma Ion	0.5	0.67	碳灰量 Carbon ash	0.038	2.032
合计 Total	1.87	100	合计 Total	1.87	100

Energy Balance能量平衡

- Heat inputterm of municipal solid waste pyrolysis system can simplify as the heat generated by the combustion of household waste and the combustion air brings in physical heat. Heat output term can simplify as four main terms, flue gas takes away physical heat, effective heat producing steam or hot water, physical heat loss of ash residue, heat loss of furnace body.
- 城市生活垃圾裂解系统的热输入项可以简化为生活垃圾燃烧所产生热、助燃空气带入物理热的两个主要项，而热输出项则以烟气带走物理热、产生蒸汽或热水的有效热、炉渣及飞灰带走的物理热和炉体散热四个主要项，以此进行简化热平衡计算参数。

收入项 IN PUT			输出项 OUT PUT		
项目 ITEM	数值 kj/h	百分比 %	项目 ITEM	数值 kj/h	百分比 %
垃圾燃烧热 Pyrolysis heat	2.45×10^8	100	排烟热损失 heat loss due to exhaust gas	0.93×10^8	23.3
空气带入热 Air entrainment heat	0	0	余热利用有效热 Effective heat	1.37×10^8	62
			不完全燃烧热损失 Incomplete combustion heat loss	0.14×10^8	5.5
			灰渣物理热损失 Physical heat loss of ash residue	0.01×10^8	0.4
			炉体散热损失 Heat loss of furnace body	0.11×10^8	4.3
			误差 Random error	0.11×10^8	4.5
合计 Total	2.45×10^8	100	合计 Total	2.45×10^8	100

COMPARISON WITH A NORMAL INCINERATOR

等离子裂解炉与正常的焚化炉的比较

	范围名称	传统垃圾焚烧方式	APSi等离子裂解方式
原料 要求	适用范围	生活垃圾和部分工业垃圾	所有固废和危废
	对废弃物预处理要求	需要	不需要
	对废弃物含水量要求	20%，不得超过50%极限	最高达85%
	对外部辅助资源要求	需加煤、油、电等助燃剂	无需任何外部资源（低电量）
	设备模块化、分布式	否	是
	对设备移动作业要求	设备大、重、不可车载移动	设备小、轻，可车载移动
运营 成本	设备运营维护成本	高	低
	100T/d处理量设备投入	2000-3000万元	900万元
	单位耗能量	60~70 kwh/T	0.75 kwh/T- 2.5 kwh/T
	设备操作情况	复杂	简便
	人工成本	高	低
	设备对场地土地要求	需要划拨土地、配合土建施工	无需占用土地、随拉随走
	单位热转换效率	1300 kcal/kg	10000 kcal/kg
排放 标准	垃圾减量化效率	最高80%	最高99%
	有色烟气排放	有	透明
	噪音污染	大	小
	异味排放	有	无
	二噁英排放	有	无
	二氧化硫排放	大量	微量
	氮氧化物排放	大量	微量

ADVANTAGES OF NEW MAGNETIC PLASMA REACTOR
磁场耐电等离子热裂分解炉的优点

- **NO FUEL** 不需要燃料 - high cost of installation but extremely low operating cost. No fuel is required on a continuous operation, the heat is self sustained through the system's plasma technology.
- **SMALL FOOTPRINT** 占地面积小 - space required for set up is minimal, system is compact and comes with double door hopper loading
- **NO TOXIC FUMES** 没有有废料毒气体 – no burning involved and hence system produces negligible detectable emission.
- **NO SMOKE & ODOUR** 没有烟雾和气味 – proprietary self cleaning process for smoke and odor that channels the air back to the reactor chamber for recycling. It does not require special facilities or pollution control licenses to set up the unit.
- **ENVIRONMENTALLY GREEN** 完全绿色环保- produces safe ceramic ash that can be reused in construction industry.
- **HAZARDOUS WASTE REDUCTION** 减少危险废物– solves organic and toxic biomedical waste onsite storage issues. Volume reduction of waste to 1/250 in the form of recyclable ceramic ash. Can be collected in a safe manner once a month or as required.
- **LOW MAINTENANCE COST** 维护成本低– minimal cleaning of filters and blower fan. Low operating expenses.

ADVANTAGES OF NEW MAGNETIC PLASMA REACTOR
磁场耐电等离子热裂分解炉的优点

- Plasmas have been proven to present effective solutions for waste treatment
  等离子体已被证明是危废物和固废处理的最有效解决方案
- Numerous plasma waste treatment facilities have been in operation for many years
  许多等离子体废物处理设施已运行多年
- Principal advantages of plasma processes 等离子体处理的主要优点
  1. Highly controllable energy densities and temperatures 高度可控的能量密度和温度
  2. Smaller installation size 较小的安装尺寸
  3. Control of process chemistry (Plasma-chemical treatment on top of thermal effects)
     工艺化学可控制(热效应之上的等离子体化学处理)
  4. Use of electricity as energy source (decouple heat generation from oxygen potential)
     使用电作为能源(从氧势中分离热产生)

- Ultimately, decisions to adopt plasma based methods rely on the following factors
  最终决定采用等离子体的方法依赖于以下主要因素
  1. Economics of scale (Cost benefits analysis required) 规模经济(成本效益分析)
  2. Minimization of toxic by-products 产生最少的有毒副产品
  3. Ability to recover/recycle by-products of treatment 能够回收/回用处理后的产品
  4. Scaling and interfacing with ancillary components 与附属组件进行缩放和接口

ALEPH PROCESS SOLUTIONS INTERNATIONAL

WASTE MATERIAL CATEGORIZATION
废弃物分类

ITEMS THAT CAN BE LOADED 物品可以加载	ITEMS THAT CANNOT BE LOADED 物品不能加载
Petroleum Products: plastic, styrofoam, pet bottle, etc. 石油产品:塑料、泡沫塑料、pet瓶等	Metals 金属材料
Tyres 轮胎材料	Glass 玻璃制品
Fisheries: bones, fishing nets, scrapes, etc. 渔业,渔骨头,渔网, 积攒等	Porcelain or china 瓷或白坯瓷制勺
Agriculture waste: animal waste, straws, tree branches, etc. 农业废弃物:动物粪便,吸管,树枝等	Stone 石块
Wood and paper: wooden pallets, carton boxes, paper waste, etc. 木头和纸:木托盘、纸箱、废纸,等等。	Construction material such as asbestos, concrete, etc. 建筑材料,如石棉、混凝土等
Medical waste: diapers, bandages, transfusion bags, etc. 医疗废物:尿布、绷带、输血袋等	Sludge, sand 污泥、沙
Food waste: waste that has less than 30% of moisture. 餐厨垃圾, 废物垃圾只要有不到30%的水分。	Explosive, fireworks, etc. 炸药、烟火等

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APS Plasma Pyrolysis Thermal Decomposition System 1st

等离子裂解炉 I型

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APS Plasma Pyrolysis Thermal Decomposition System 2nd

等离子裂解炉 II型

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APS Plasma Pyrolysis Thermal Decomposition System 3rd

等离子裂解炉 III型

家庭生活垃圾分类方法

餐厨垃圾 Kitchen waste

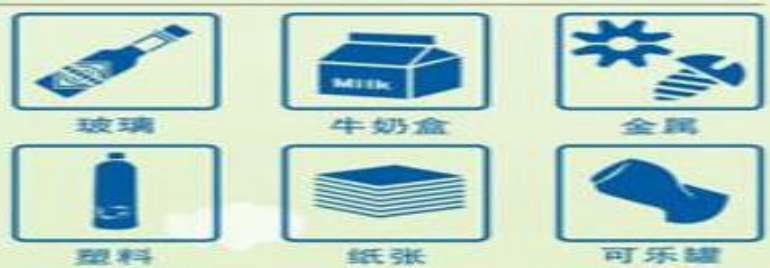
厨房产生的食物类垃圾以及果皮等。

主要包括：剩菜剩饭与西餐糕点等食物残余、菜梗菜叶、动物骨骼内脏、茶叶渣、水果残余、果壳瓜皮、废弃食用油等。

可回收物 Recyclable

再生利用价值较高，能进入废品回收渠道的垃圾

主要包括：纸类（报纸、传单、杂志、旧书、纸板箱及其它未受污染的纸制品等）、金属（铁、铜、铝等制品）、玻璃（玻璃瓶罐、平板玻璃及其它玻璃制品）、除塑料袋外的塑料制品（泡沫塑料、塑料瓶、硬塑料等）、橡胶及橡胶制品、饮料瓶（可乐罐、塑料饮料瓶、啤酒瓶等）等。



有害垃圾 Harmful waste

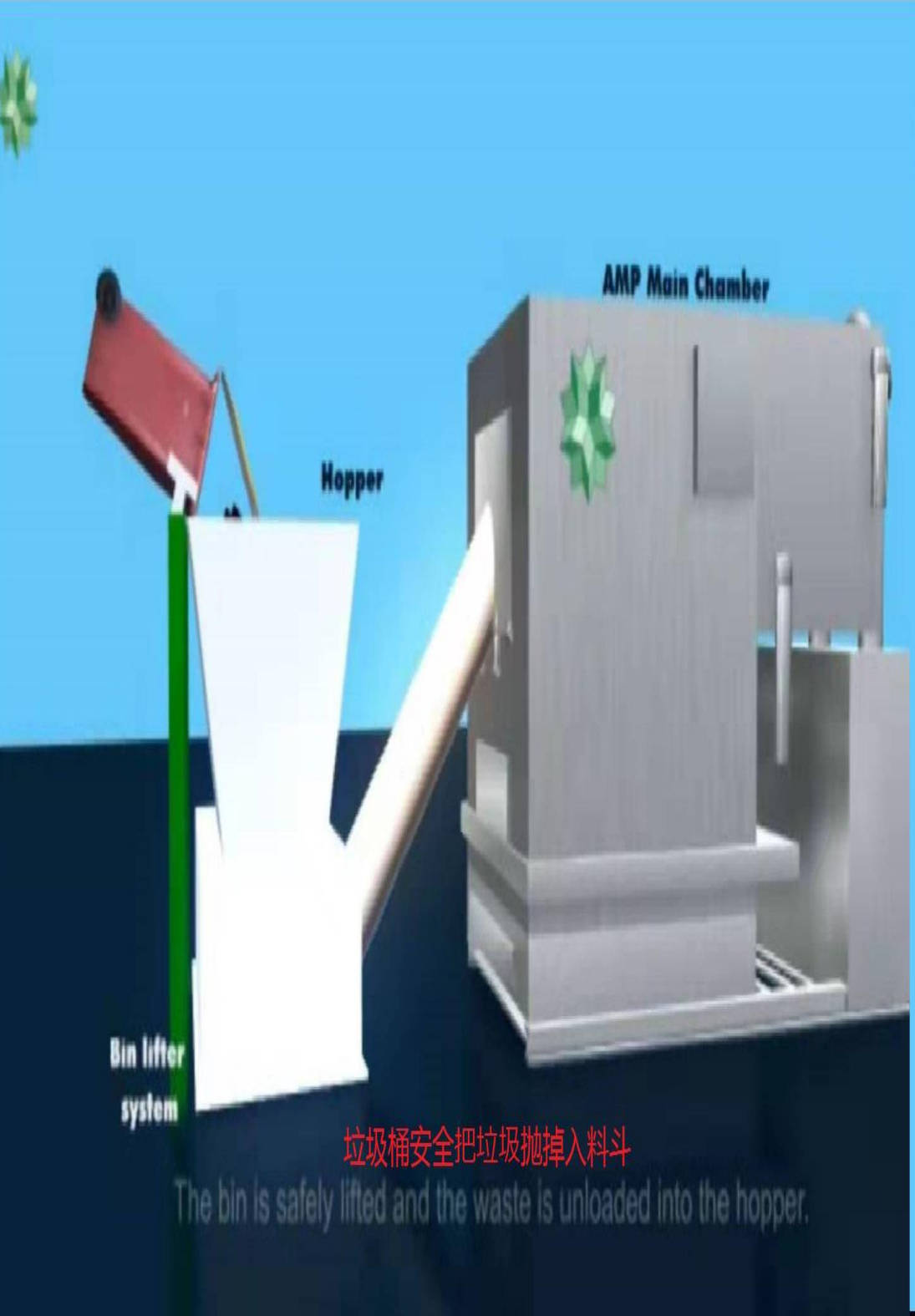
含有有毒有害化学物质的垃圾。

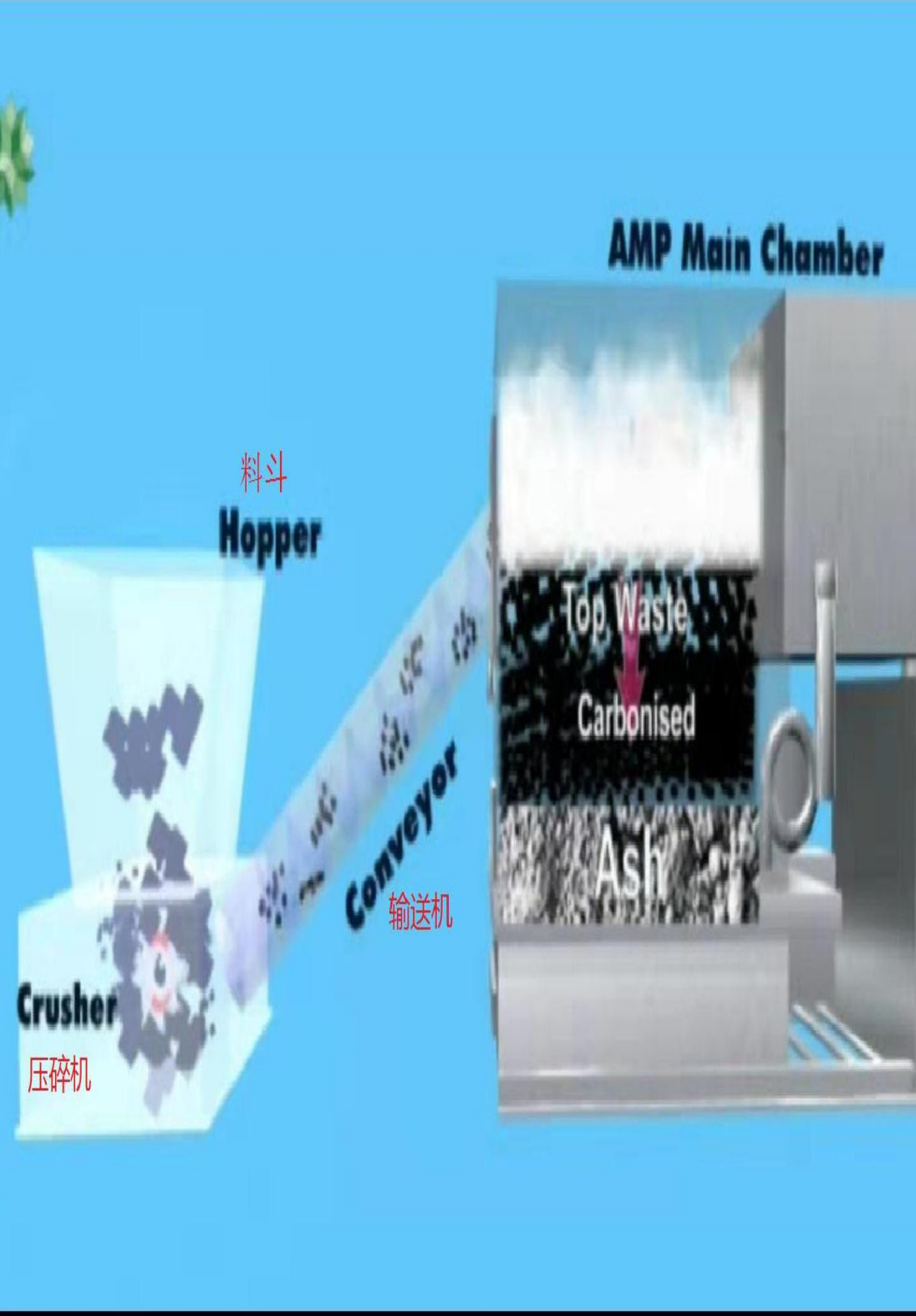
主要包括：电池（蓄电池、钮扣电池等）、废旧电子产品、废旧灯管灯炮、过期药品、过期日用化妆用品、染发剂、杀虫剂容器、除草剂容器、废弃水银温度计、废油漆桶、废打印机墨盒等。

其它垃圾 Other waste

除去可回收物、有害垃圾、厨房垃圾之外的所有垃圾的总称

主要包括：受污染与无法再生的纸张（纸杯、照片、复写纸、压敏纸、收据用纸、明信片、相册、卫生纸、尿片等）、受污染或其他不可回收的玻璃、塑料袋与其他受污染的塑料制品、废旧衣物与其他纺织品、破旧陶瓷品、妇女卫生用品、一次性餐具、贝壳、烟头、灰土等。


AMP Main Chamber
Hopper
Bin lifter system
垃圾桶安全把垃圾抛掉入料斗
The bin is safely lifted and the waste is unloaded into the hopper.


AMP Main Chamber
料斗
Hopper
Top Waste
Carbonised
Ash
Conveyor
输送机
Crusher
压碎机

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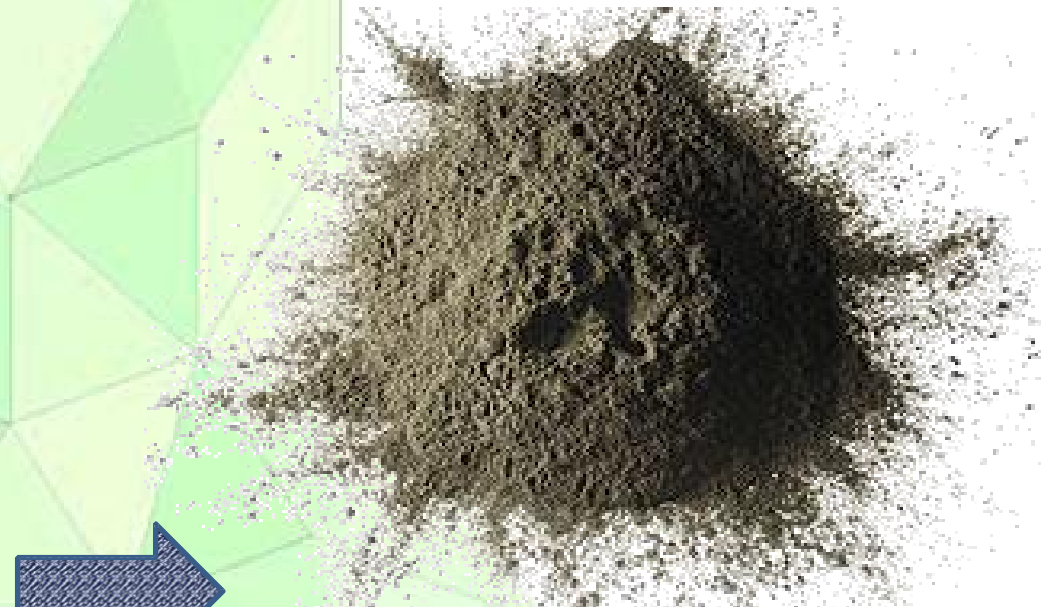
FEED MATERIALS & BY-PRODUCTS
废弃物和副产品

Waste Stream 废物源流

Carbon Ash 碳质灰



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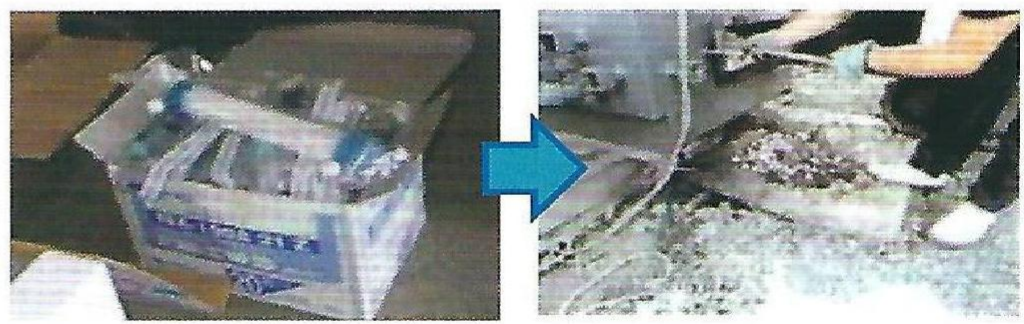
Project Reference 项目参考

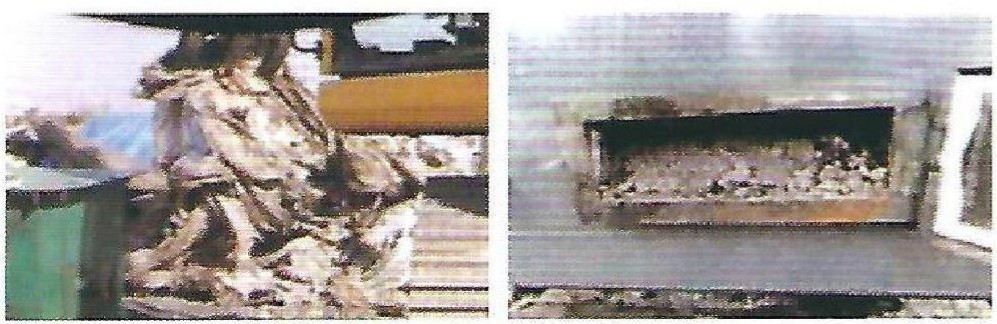
Tyres 轮胎材料

180 型　乘用車古タイヤ
約 90 本／日　24h
（内部のワイヤーが残る）

Medical waste医疗废物:尿布,输血袋等

180 型　6 m³　処理／日　24h
（病院敷地内の設置可）





Agriculture waste: animal waste

农业废弃物, 动物粪便

180 型　8～10 m³　処理／日　24h
（投入物により異なります）

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Project Reference Medical waste

医疗废物:尿布,输血袋等项目参考

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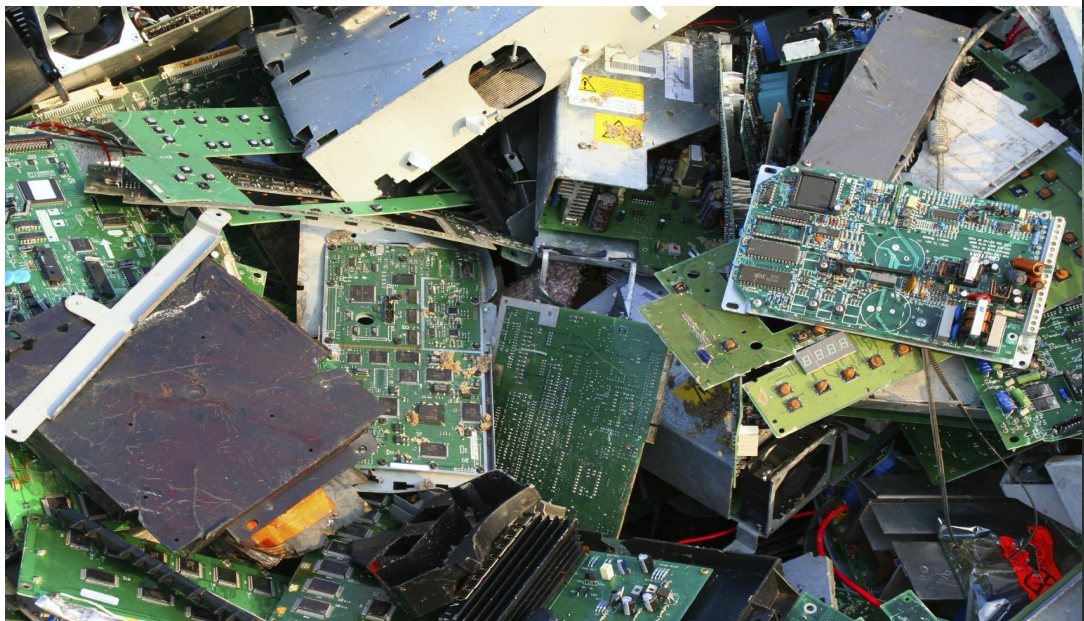
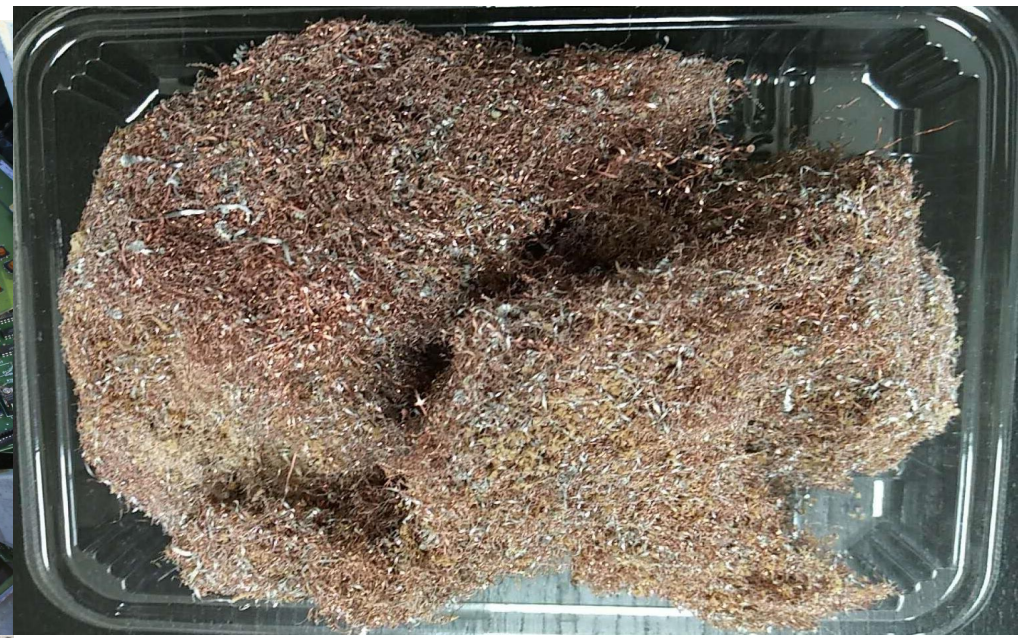
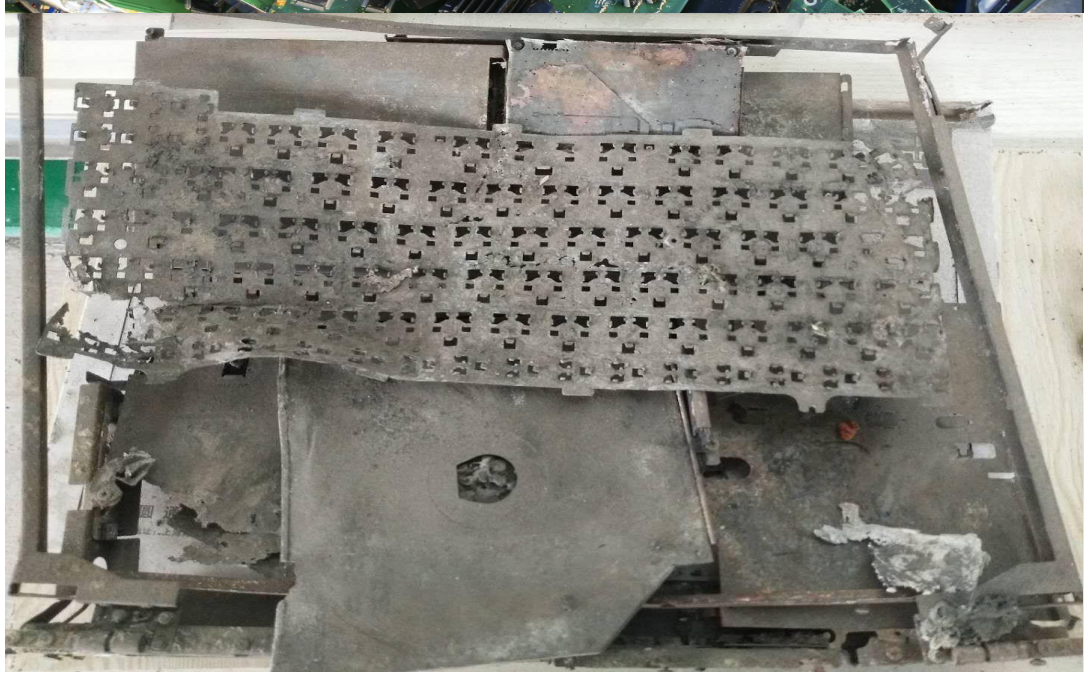
Project Reference of Electrical Waste 电子废弃物 等项目







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Project Reference of Tire waste

轮胎废弃物等项目

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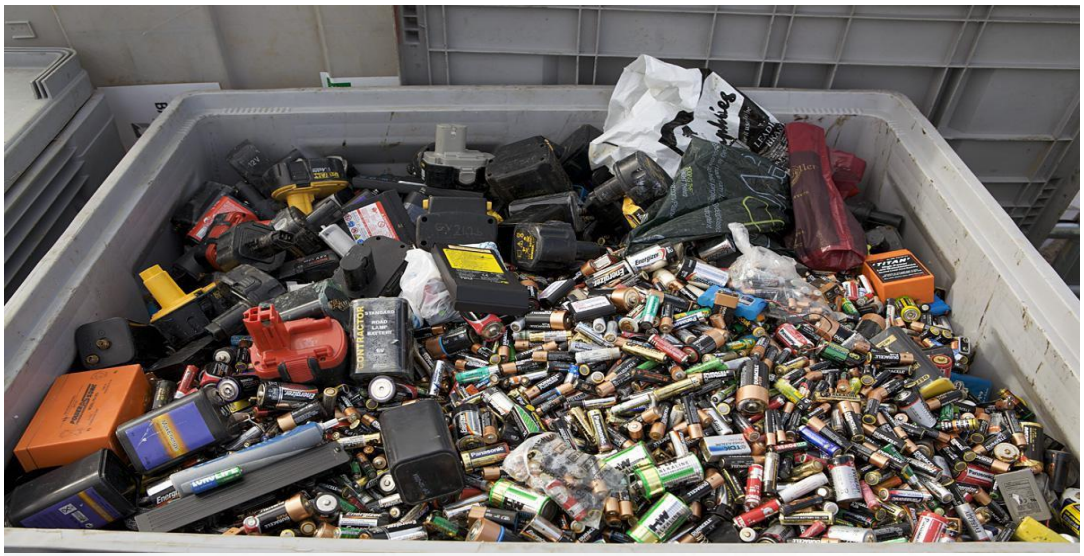
Project Reference of Battery-Waste

废电池弃物等项目



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Project Reference of Waste Glass

废玻璃弃物等项目

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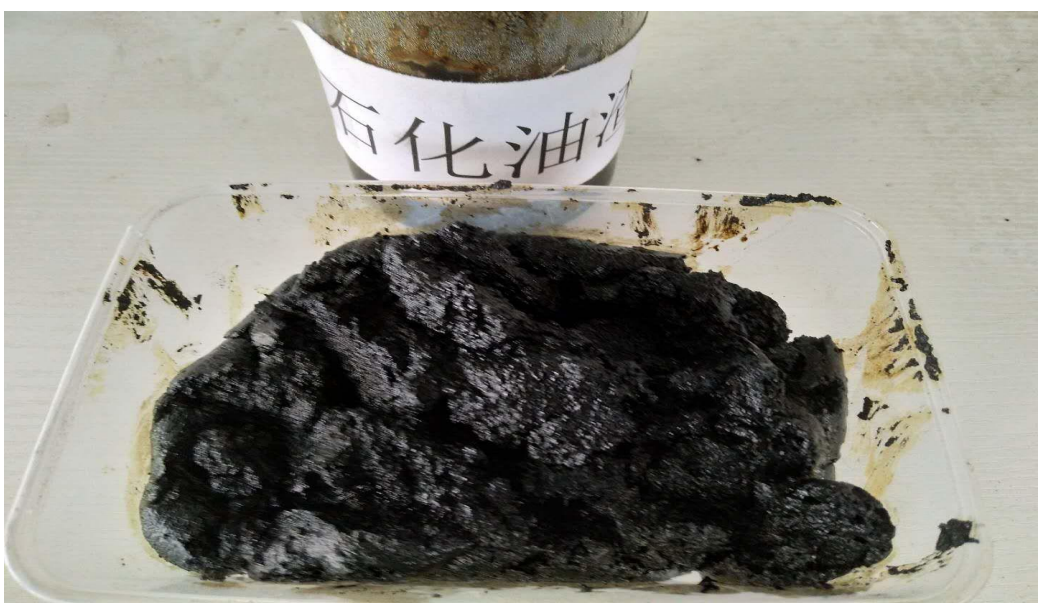
Project Reference of Waste Oily Sludge

废油渣等项目



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Carbon Ash Testing Result
碳灰质检测报告

161712050337

练达检测

检测报告

练达检字[2018] 847 号

委托单位：武汉市艾义法德环保科技有限公司

检测类别：委托检测

业务单号：SJ8-065

报告日期：2018 年 11 月 19日

武汉练达检测技术有限公司

（加盖检测报告专用章）

五、检测结果

固废检测结果见表 5-1

表 5-1 固废检测结果

检测项目	检测时间	检测结果		
		S、M 石化废油渣	D、C 大庆废油渣	P、M 生活垃圾
银(mg/kg) Silver	2018 年 11 月 19日	1.6	0.9	1.1
钡(mg/kg) Barium		202	36.0	224
铍(mg/kg) Beryllium		0.58	ND(0.04)	0.11
镉(mg/kg) Cadmium		2.5	1.0	2.5
钴(mg/kg) Cobalt		66.7	275	31.2
铬(mg/kg) Chromium		296	399	128
铜(mg/kg) Copper		332	1.01×10^3	1.11×10^3
铁(mg/kg) Iron		7.99×10^4	2.22×10^3	2.25×10^4
锰(mg/kg) Manganum		3.21×10^3	2.19×10^3	211
镍(mg/kg) Nickel		408	544	118
铅(mg/kg) Lead		141	23.3	1.64×10^3
铊(mg/kg) Thallium		ND(0.4)	ND(0.4)	ND(0.4)
锑(mg/kg) Antimonium		1.14×10^3	71.8	141
砷(mg/kg) Arsenic		52.2	135	21.3
汞(mg/kg) Mercury		0.026	0.046	0.020
锌(mg/kg) Zinc		1.26×10^4	4.02×10^3	6.96×10^3
氟化物(mg/kg) Fluoride		95.9	62.8	154

以下空白

编制：[illegible] 审核：[illegible] 签发：[illegible]

日期：2018.11.19 日期：2018.11.19 日期：2018.11.19

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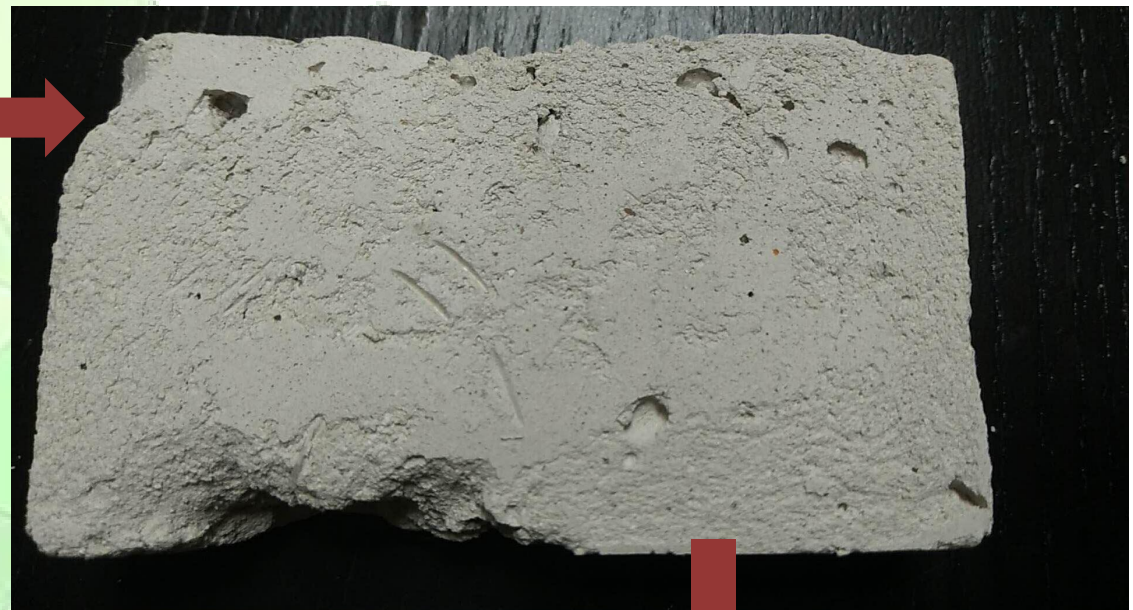
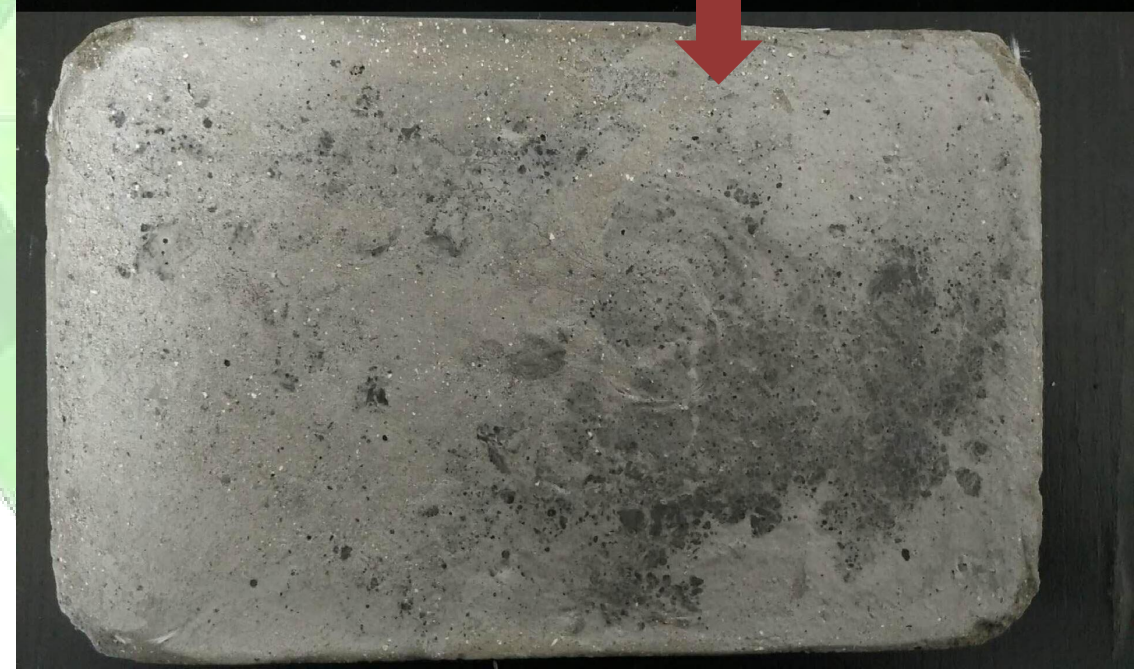
Carbon Ash Into Plasterboard and Brick

碳灰成石膏扳或水泥砖





The system disintegrate the debris from the earthquake , at the same time regenerate heat from the system to provide hot water for 1000 persons

系统分解从地震来的废弃物,同时系统再生的热量为1000人提供热水

Place installing 安装位置	Date 日期	Item 项目	treatment process项目处理工艺流程
鯉渕学園 (茨城県水戸市)	2008 年～2010 年	野菜クズ、生ゴミ、木クズ、落葉	野菜栽培ハウスの加温気を使用せず熱分解発生熱を利用しハウス栽培 2010 年 3 月 2 日　日本農業新聞掲載
イセ食品 (茨城県水戸市)	2008 年～2012 年	鶏糞	1 日 10ｔ発生する鶏糞処理
ひかみの園 (岩手県陸前高田市)	2010 年～7 カ月	震災ゴミ、ガレキ、生ゴミ	対象物を燃料として熱分解熱を利用し温水を提供すると共に浴場を設置し被災者に浴場を提供 2010 年 3 月 2 日　読売新聞掲載 2011 年 8 月 13 日　ＴＢＳ報道特集放送
石巻クリーンセンター (宮城県石巻市)	2010 年～2012 年	震災ゴミ、ガレキ、紙クズ	一般ゴミ処理
女川町クリーンセンター (宮城県女川町)	2010 年～4 カ月	震災ゴミ	街の焼却設備が間に合わず震災により発生した一般ゴミ処理 2010 年 4 月 26 日　石巻河北新聞掲載
(株)コンベック (埼玉県さいたま市)	2015 年～現在稼働中	木クズ、生ゴミ、汚泥など	データ収集の為あらゆる有機物を熱分解処理中 (事前予約で見学可能)

MAGNETIC PLASMA REACTOR ASH BY PRODUST TEST RESULT
磁场耐电等离子热裂分解炉灰烬副产物含量试验结果

- Below are the ASH Test Result (source retrieved from reactor chamber):
- 下面是灰烬含量试验成分结果 (源从反应堆检索室)

Analysis Report 分析报告	Analysis Result 化验结果	Landfill Critical 垃圾填埋鉴定	Standard Value 标准参数值
Alkali Mercury 碱汞化合物	≤ 0.0005	Not Detectable未检	0.0005
Mercury Compounds水银化合物	≤ 0.0005	0.005	0.0005
Cadmium Compounds镉化合物	≤ 0.01	0.3	0.01
Lead Compounds铅及其化合物	≤ 0.01	0.3	0.01
Hexavalent Chromium Compounds六价铬化合物	0.045	1.5	0.01
Arsenic Compounds砷及其化合物	≤ 0.01	0.3	0.01
Selenium compounds硒及其化合物	≤ 0.01	0.3	0.01
Nitrogen oxide Compounds氮氧化物	≤ 0.01	0.3	0.01

- Note: Normal incinerators are not able to meet international regulations for complete breakdown of materials such as Polychlorinated Biphenyls (PCB), hazardous biomedical waste, organic solvents
- 正常的焚化炉不能完全分解的材料符合国际规定, 如多氯联苯(PCB)、有害生物医学垃圾,有机溶剂

MAGNETIC PLASMA REACTOR WASTE WATER TEST RESULT
磁场耐电等离子热裂分解炉废水含量试验结果

- Below are the waste water Test Result (source retrieved from reactor chamber):
- 下面是废水含量试验成分结果 (源从反应堆检索室)

Analysis Report 分析报告	Analysis Result 化验结果 mg/L	Standard Value 标准参数值
1. Alkali Mercury Compounds碱汞化合物	Not Detectable未检	Not Detectable未检
2. Mercury Compounds水银化合物	< 0.0005	0.005
3. Cadmium Compounds镉化合物	< 0.01	0.1
4. Lead Compounds铅及其化合物	< 0.01	0.1
5. Hexavalent Chromium Compounds六价铬化合物	< 0.05	0.5
6. Arsenic Compounds砷及其化合物	< 0.01	0.1
7. Organic Phosphorus Compounds有机磷化合物	< 0.1	1
8. Nitrogen oxide Compounds氮氧化物	< 0.01	0.1
9. Cyanide Compounds氰化合物	0.21	1
10. PCB 多氯化联（二）苯	< 0.0005	0.003
11. Trichloroethylene 三氯乙烯	0.03	0.3

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MAGNETIC PLASMA REACTOR WASTE WATER TEST RESULT

磁场耐电等离子热裂分解炉废水含量试验结果

- Below are the waste water Test Result (source retrieved from reactor chamber):
- 下面是废水含量试验成分结果 (源从反应堆检索室)

Analysis Report 分析报告	Analysis Result 化验结果 mg/L	Standard Value 标准参数值
12. Tetrachloroethylene PCE 四氯乙烯	< 0.01	0.1
13. Dichloromethane二氯甲烷	< 0.02	0.2
14. Carbon Tetrachloride四氯化碳	< 0.002	0.02
15. 1,2-Dichloroethane 1 2-二氯乙烷	0.005	0.04
16. 1.1-Trichloroethane1.1三氯乙烷	> 0.3	3
17. 1,2-Trichloroethane1,2-三氯乙烷	> 0.006	3
18. 1,1-Dichloroethylene三氯乙烯	> 0.01	0.1
19. Cyanide Compounds氰化合物	0.21	1
20. Selenium Compounds 含硒化合物	> 0.01	0.1
21. 1,3-Dichloropropene1,3-二氯丙烯-	< 0.002	0.02
22. Benzene 苯	0.04	0.1

MAGNETIC PLASMA REACTOR WASTE WATER TEST RESULT

磁场耐电等离子热裂分解炉废水含量试验结果

- Below are the waste water Test Result (source retrieved from reactor chamber):
- 下面是废水含量试验成分结果 (源从反应堆检索室)

Analysis Report 分析报告	Analysis Result 化验结果 mg/L	Standard Value 标准参数值
22. BOD	< 13.5	≤15-20
23.COD	< 12.8	≤10-20
24. pH	< 7.2-7.6	6.0-8.5
25. SS	25.5	20-40
26. DO	< 2.2	2.0-7.5 ≤
27. Total nitrogen	0.08	≤0.2 - 1
28. Total phosphorous	< 0.01	≤ 0.02 - 0.09
29. All Zinc	< 0.005	≤ 1

Above Analytical Test are conducted by SAITAMA RUBBER CO. LTD-Environmental MESH , according to Japan's Environmental Law 1973, Chapter 13.

以上分析测试是由埼玉县橡胶有限公司, 根据日本1973年代环境法,第13章试验结果

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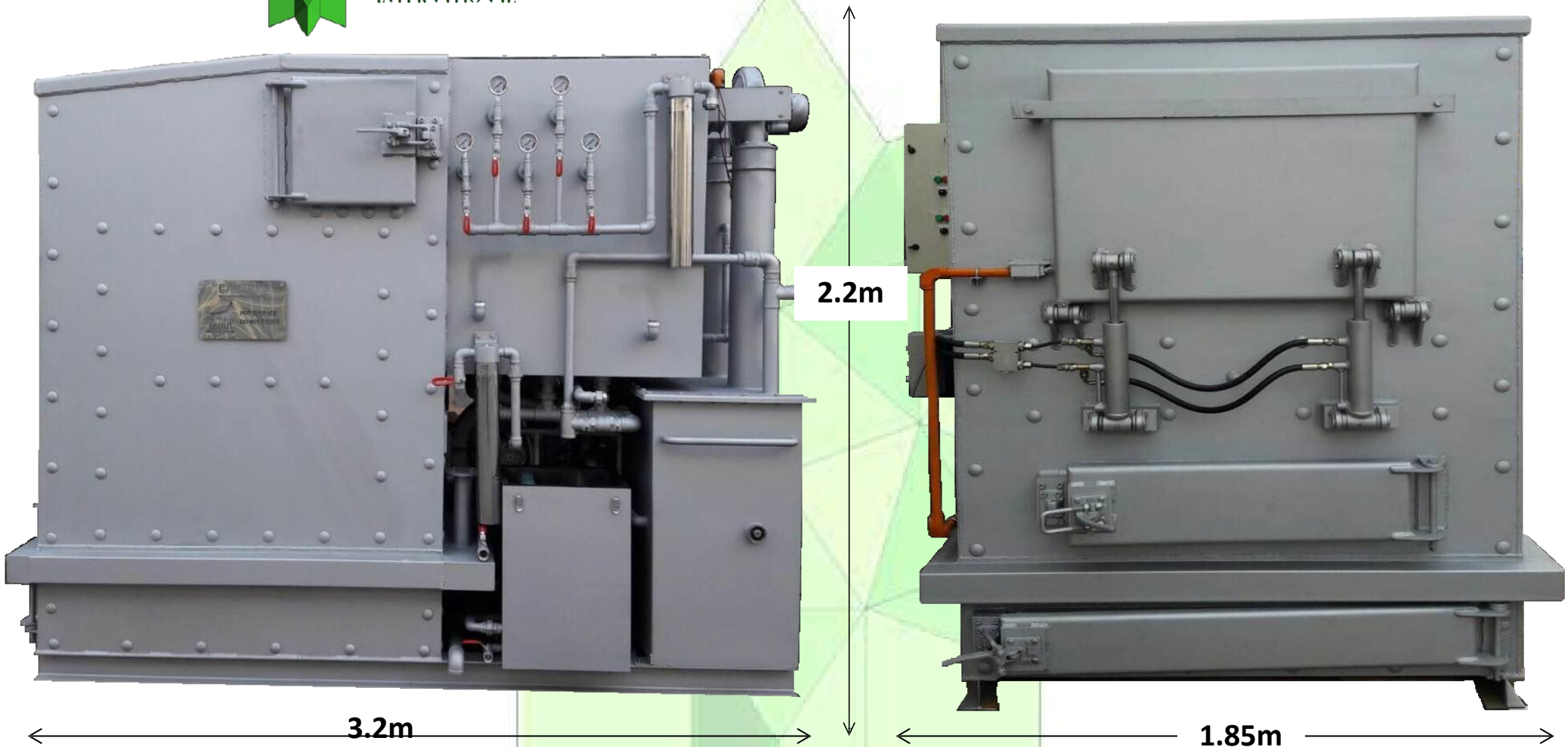
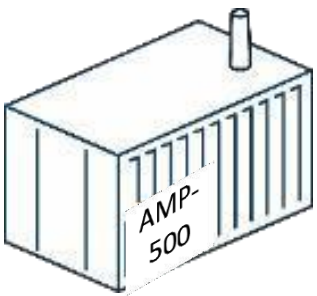
Plasma Model and Size 等离子裂解炉型号



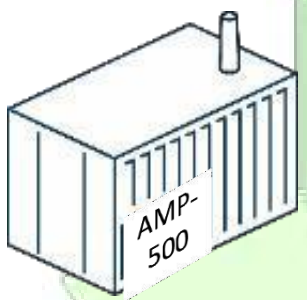
	Width	Depth (Length)	Depth (inter)	Height	Capability	Operation/day	
AMP-500	1.85m	3.2m	1.9m	2.2m	1.2 m^3/hrs	5-30 m^3/day	5,500kg
AMP-1000	2.4m	6.2m	4.2m	2.4m	3.8 m^3/hrs	30-100m^3/day	11,000kg

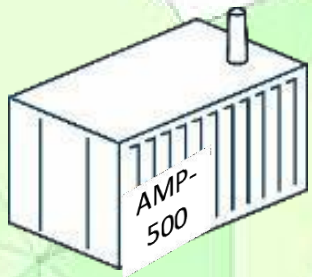
Plasma Model and Size 等离子裂解炉型号

Modular, distributed 模块化、分布式

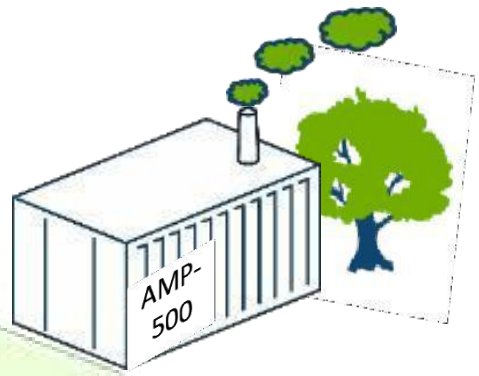


Einfach 简易

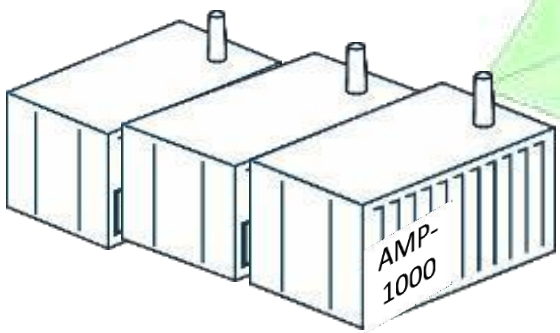




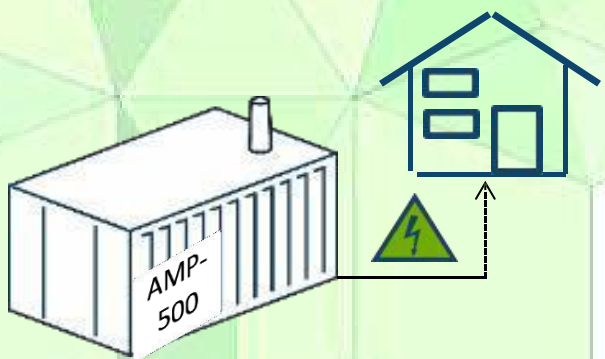
Mobil 移动性



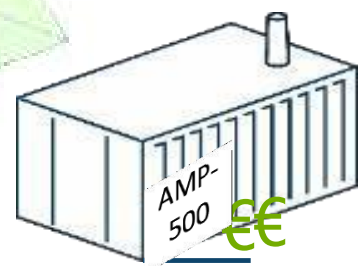
Umweltfreundlich 环保



Modular 模块化



Dezentral
可发电分布式



Profitable 高利润

Performance Parameters 性能参数

Power Electricity Consumption 供耗电量

MODEL	Plasma Reactor	Air Blower	Air Scrubber	Water Colder	Water Pump	Scrap Shredder	Bin Lifter	Total: Kwh/Day
AMP-500								168kw/day
AMP-1000								432kw/day

Power cost analysis 耗电运行成本分析

Power cost in China 在中国耗电运行成本=

(¥0.85kwh X 168kw÷30 m^3)/Day ≈ ¥ 4.76 人民币 /吨

(¥0.85kwh X 432kw÷100m^3)/Day ≈ ¥ 3.67 人民币 /吨

Power cost in SG 在新加坡耗电运行成本=

($0.25kwh X 168kw ÷30 m^3)/Day ≈ $1.40/吨

($0.25kwh X 432kw ÷100$m^3$)/Day ≈ $1.08/吨

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International Intellectual Property Rights Certificate

国际知识产权发明专利证书

证书号第637807号

发明专利证书

发明名称：等离子裂解反应炉装置

发明人：张煌辉

专利号：ZL 2017 2 1579022.3

专利申请日：2017年11月23日

专利权人：张煌辉

授权公告日：2018年08月11日

本发明经过本局依照中华人民共和国专利法进行审查，决定授予专利权，颁发本证书并在专利登记簿上予以登记。专利权自授权公告之日起生效。

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局长 [illegible]

中华人民共和国国家知识产权局

2010年06月09日

第1页（共1页）

THE REGISTRY OF PATENTS
SINGAPORE

THE PATENTS ACT
(CHAPTER 221)

CERTIFICATE OF GRANT OF PATENT

In accordance with section 35 of the Patents Act, it is hereby certified that a patent having the P-No. 168445 has been granted in respect of an invention having the following particulars:

Title	:	MAGNETIC PLASMA REACTOR
Application Number	:	200905226-7
Date of Filing	:	05 August 2009
Priority Data	:	-
Name of Inventor(s)	:	TEO HONG HWEE
Name(s) and Address(es) of Proprietor(s) of Patent	:	TEO HONG HWEE 45 JURONG EAST AVE 1, #02-04 PARC OASIS, SINGAPORE 609779
Date of Grant	:	31 March 2011

Dated this 31st day of March 2011.

Liew Woon Yin (Ms)
Registrar of Patents
Singapore

Intellectual Property Rights 知识产权

证书号第4788323号

外观设计专利证书

外观设计名称：磁场耐电等离子反应器

设　计　人：张辉

专　利　号：ZL 2017 3 0529919.4

专利申请日：2017年10月27日

专利权人：武汉市艾义法德环保科技有限责任公司

地　　址：430000 湖北省武汉市青山区环保科技产业园百超钢材加工配送基地A街（20号楼）06-10号

授权公告日：2018年08月14日　　授权公告号：CN 304773180 S

本外观设计经过本局依照中华人民共和国专利法进行初步审查，决定授予专利权，颁发本证书并在专利登记簿上予以登记。专利权自授权公告之日起生效。

本专利的专利权期限为十年，自申请日起算。专利权人应当依照专利法及其实施细则规定缴纳年费。本专利的年费应当在每年10月27日前缴纳。未按照规定缴纳年费的，专利权自应当缴纳年费期满之日起终止。

专利证书记载专利权登记时的法律状况。专利权的转移、质押、无效、终止、恢复和专利权人的姓名或名称、国籍、地址变更等事项记载在专利登记簿上。

局长
申长雨

国家知识产权局
2018年08月14日

第1页（共1页）

证书号第7710729号

实用新型专利证书

实用新型名称：等离子反应炉装置

发　明　人：张煌辉

专　利　号：ZL 2017 2 1579022.3

专利申请日：2017年11月23日

专利权人：武汉市艾义法德环保科技有限责任公司

地　　址：430000 湖北省武汉市青山区环保科技产业园百超钢材加工配送基地A街（20号楼）06-10号

授权公告日：2018年08月14日　　授权公告号：CN 207729604 U

本实用新型经过本局依照中华人民共和国专利法进行初步审查，决定授予专利权，颁发本证书并在专利登记簿上予以登记。专利权自授权公告之日起生效。

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局长
申长雨

国家知识产权局
2018年08月14日

第1页（共1页）

ALLPH
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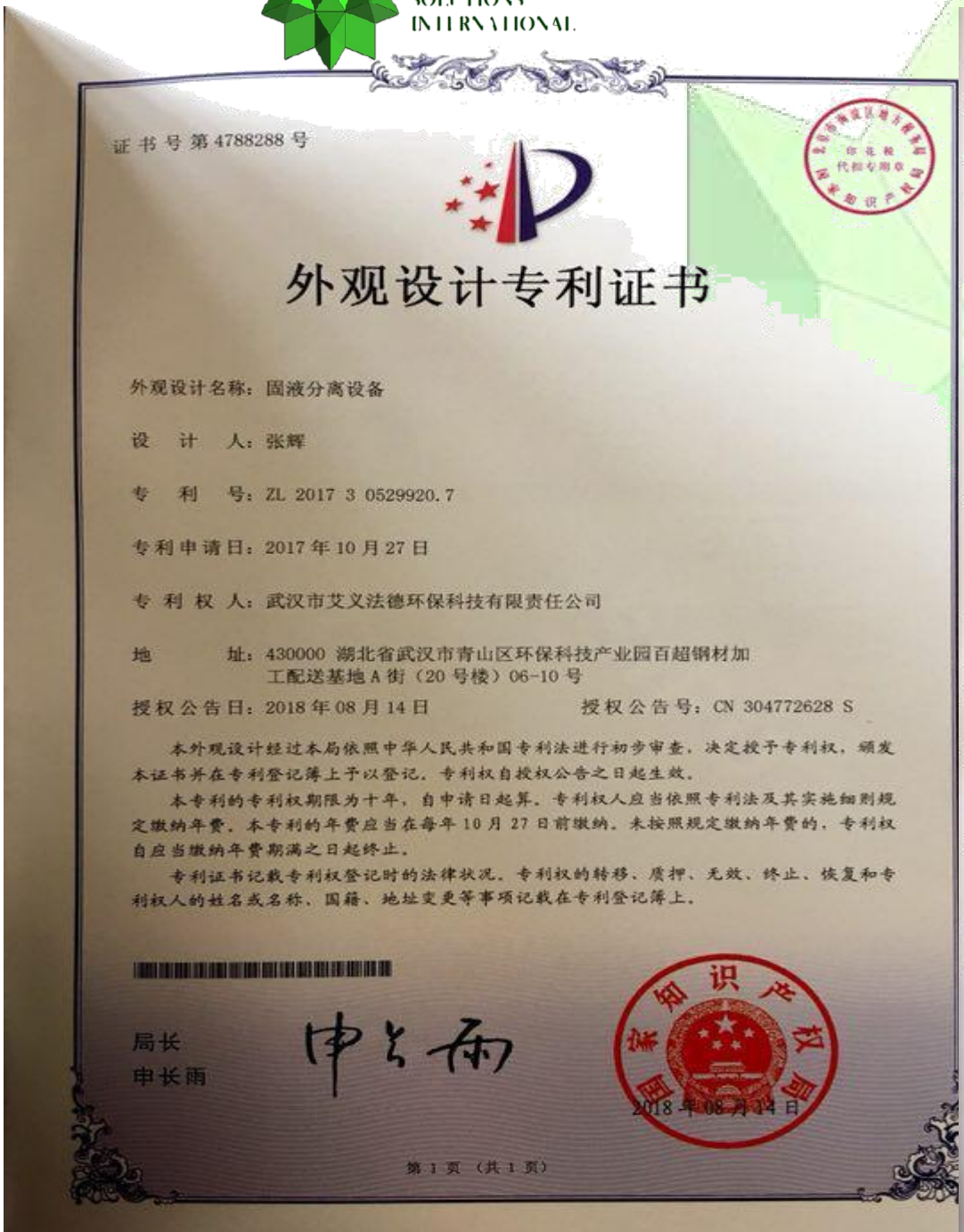
SOLUTIONS
INTERNATIONAL

Intellectual Property Rights 知识产权



证书号第4788288号

外观设计专利证书

外观设计名称：固液分离设备

设　计　人：张辉

专　利　号：ZL 2017 3 0529920.7

专利申请日：2017年10月27日

专 利 权 人：武汉市艾义法德环保科技有限责任公司

地　　址：430000 湖北省武汉市青山区环保科技产业园百超钢材加工配送基地A街（20号楼）06-10号

授权公告日：2018年08月14日　　授权公告号：CN 304772628 S

本外观设计经过本局依照中华人民共和国专利法进行初步审查，决定授予专利权，颁发本证书并在专利登记簿上予以登记。专利权自授权公告之日起生效。

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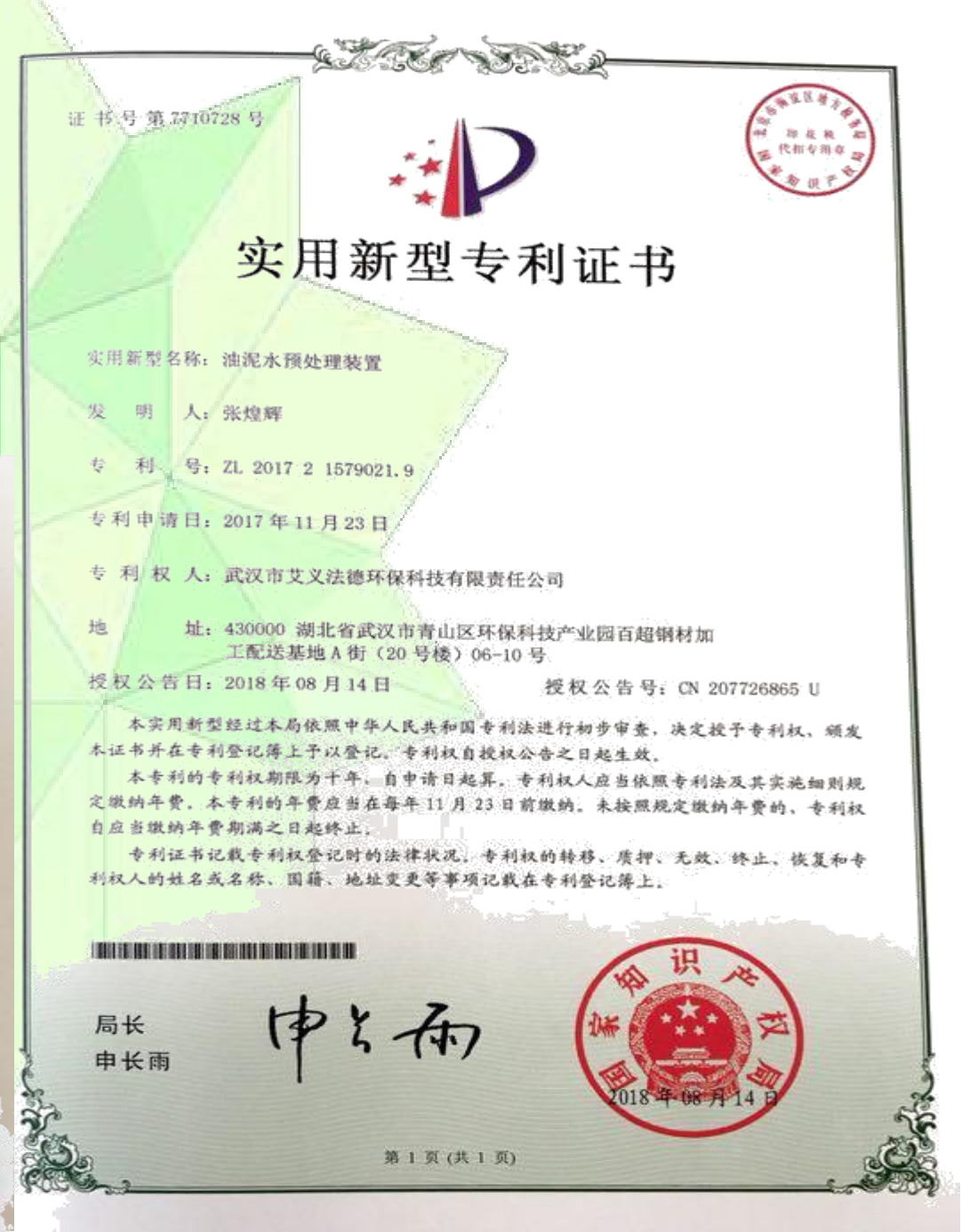
局长
申长雨

国家知识产权局

2018年08月14日

第1页（共1页）



证书号第7710728号

实用新型专利证书

实用新型名称：油泥水预处理装置

发　明　人：张煌辉

专　利　号：ZL 2017 2 1579021.9

专利申请日：2017年11月23日

专 利 权 人：武汉市艾义法德环保科技有限责任公司

地　　址：430000 湖北省武汉市青山区环保科技产业园百超钢材加工配送基地A街（20号楼）06-10号

授权公告日：2018年08月14日　　授权公告号：CN 207726865 U

本实用新型经过本局依照中华人民共和国专利法进行初步审查，决定授予专利权，颁发本证书并在专利登记簿上予以登记。专利权自授权公告之日起生效。

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局长
申长雨

国家知识产权局

2018年08月14日

第1页（共1页）

ALPHA PROCESS SOLUTIONS INTERNATIONAL

International Corporate Certificate

国际企业公司证书

WMRAS
Waste Management & Recycling Association of Singapore

This is to certify that

ALPHA PROCESS SOLUTIONS PTE LTD

is an Associate Member for the period

June 2018 to May 2019

Chairman
Melissa Tan

Secretary
Jürgen Militz

National Member of:

ISWA
International Solid Waste Association

Founding Member of:

APWEA
Asia Pacific Waste & Environment Alliance

Affiliated Organisations:

SWANA
Solid Waste Association of North America

Chartered Institution of Wastes Management

Waste Management Association of Australia

Certificate of Registration of a Company

ASIC
Australian Securities & Investments Commission

This is to certify that

ALPHA PROCESS SOLUTIONS AUSTRALIA PTY LTD

Australian Company Number 621 967 164

is a registered company under the Corporations Act 2001 and is taken to be registered in New South Wales.

The company **is limited by shares.**

The company is a **proprietary** company.

The day of commencement of registration is **the twenty-eighth day of September 2017.**

Issued by the
Australian Securities and Investments Commission
on this twenty-eighth day of September, 2017.

Greg Medcraft
Chairman

CERTIFICATE

ALEPH PROCESS SOLUTIONS INTERNATIONAL

International Corporate Certificate

国际企业公司证书

营业执照

(副本)

统一社会信用代码 91420100MA4KW0Y2XP

名称 武汉雅发环境科技有限公司

类型 有限责任公司(中外合资)

住所 武汉市青山区丝茅墩42栋3层320室

法定代表人 张煌辉

注册资本 壹仟伍佰万元人民币整

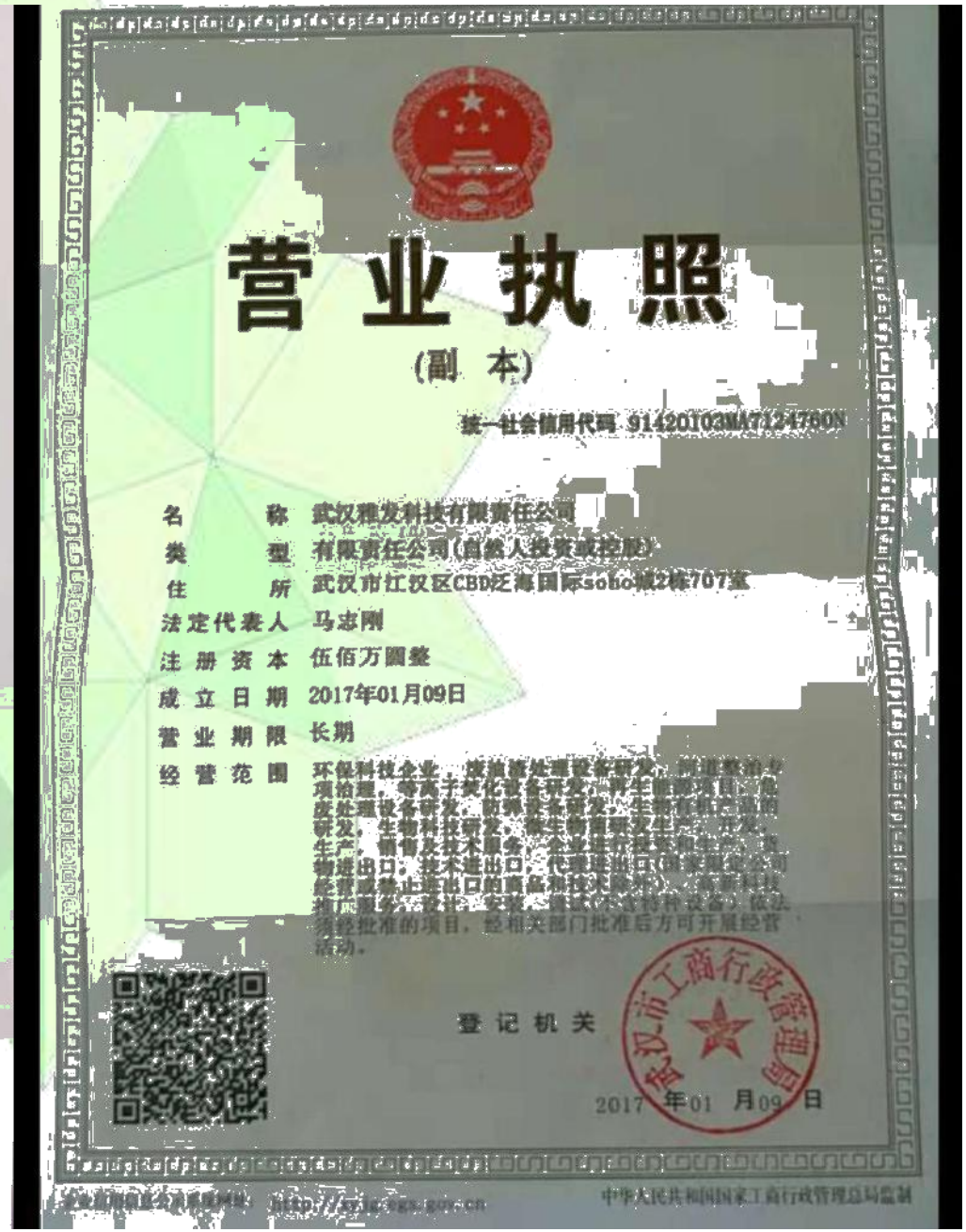
成立日期 2017年07月13日

营业期限 2017年07月13日至2037年07月12日

经营范围 环保科技研发；废油渣处理设备研发；等离子焚化设备研发、生产、销售及技术服务；技术推广服务；专业化设计服务；自营和代理各类商品和技术的进出口（但国家限定公司经营和禁止进出口的商品和技术除外）（上述经营范围不涉及外商投资准入特别管理措施）（依法须经审批的项目，经相关部门审批后方可开展经营活动）。

登记机关

2017 年 07 月 13 日



营业执照

(副本)

统一社会信用代码 91420103MA7124760N

名称 武汉雅发科技有限责任公司

类型 有限责任公司(自然人投资或控股)

住所 武汉市江汉区CBD泛海国际soho城2栋707室

法定代表人 马志刚

注册资本 伍佰万圆整

成立日期 2017年01月09日

营业期限 长期

经营范围 环保科技企业，废油渣处理设备研发，[illegible]项治理，等离子焚化设备研发，[illegible]废处理设备研发，[illegible]研发，生物科技研发，[illegible]生产，销售及技术服务，[illegible]物进出口，技术进出口，代理进出口（[illegible]经营或禁止进出口的商品和技术除外）[illegible]依法须经批准的项目，经相关部门批准后方可开展经营活动。

登记机关

2017 年 01 月 09 日

ALPHA PROCESS SOLUTIONS INTERNATIONAL

International Corporate Certificate

国际企业公司证书

SỞ KẾ HOẠCH VÀ ĐẦU TƯ
THÀNH PHỐ HỒ CHÍ MINH
PHÒNG ĐĂNG KÝ KINH DOANH

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

GIẤY CHỨNG NHẬN ĐĂNG KÝ DOANH NGHIỆP
CÔNG TY TRÁCH NHIỆM HỮU HẠN MỘT THÀNH VIÊN

Mã số doanh nghiệp: 0314354296

Đăng ký lần đầu: ngày 17 tháng 04 năm 2017

1. Tên công ty

Tên công ty viết bằng tiếng Việt: CÔNG TY TNHH ALPHA PROCESS SOLUTIONS VIET NAM

Tên công ty viết bằng tiếng nước ngoài: ALPHA PROCESS SOLUTIONS VIET NAM COMPANY LIMITED

Tên công ty viết tắt:

2. Địa chỉ trụ sở chính

Tầng 1, tòa nhà Packsimex, 52 Đông Du, Phường Bến Nghé, Quận 1, Thành phố Hồ Chí Minh, Việt Nam

Điện thoại: Fax:
Email: Website:

3. Vốn điều lệ 2.000.000.000 đồng

Bằng chữ: Hai tỷ đồng

4. Thông tin về chủ sở hữu

Họ và tên: TRẦN THANH HIỀN Giới tính: *Nam*

Sinh ngày: *04/06/1988* Dân tộc: *Kinh* Quốc tịch: *Việt Nam*

Loại giấy tờ chứng thực cá nhân: *Thẻ căn cước công dân*

Số giấy chứng thực cá nhân: *024028277*

Ngày cấp: *18/06/2014* Nơi cấp: *CA TP.HCM*

Nơi đăng ký hộ khẩu thường trú: *11/7 Ngô Y Linh, Phường An Lạc, Quận Bình Tân, Thành phố Hồ Chí Minh, Việt Nam*

Chỗ ở hiện tại: *11/7 Ngô Y Linh, Phường An Lạc, Quận Bình Tân, Thành phố Hồ Chí Minh, Việt Nam*

5. Người đại diện theo pháp luật của công ty

REPUBLIC OF THE PHILIPPINES
SECURITIES AND EXCHANGE COMMISSION
SEC Building, EDSA, Greenhills
City of Mandaluyong, Metro Manila

COMPANY REG. NO. CS201705657
COMPANY TIN 009-567-649

CERTIFICATE OF INCORPORATION

KNOW ALL PERSONS BY THESE PRESENTS:

This is to certify that the Articles of Incorporation and By-Laws of

ALPHA PROCESS SOLUTIONS PHILS INC.

were duly approved by the Commission on this date upon the issuance of this Certificate of Incorporation in accordance with the Corporation Code of the Philippines (Batas Pambansa Blg.68), and copies of said Articles and By-Laws are hereto attached.

This Certificate grants juridical personality to the corporation but does not authorize it to undertake business activities requiring a Secondary License from this Commission such as, but not limited to acting as: broker or dealer in securities, government securities eligible dealer (GSED), investment adviser of an investment company, close-end or open-end investment company, investment house, transfer agent, commodity/financial futures exchange/broker/merchant, financing company, pre-need plan issuer, general agent in pre-need plans and time shares/club shares/membership certificates issuers or selling agents thereof. Neither does this Certificate constitute as permit to undertake activities for which other government agencies require a license or permit.

As a registered corporation, it shall submit annually to this Commission the reports indicated at the back of this certificate.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of this Commission to be affixed at Mandaluyong City, Metro Manila, Philippines, this 16th day of February, Twenty Seventeen.

SAMPAGUITA R.H. LADRIDO
Officer-in-Charge
Company Registration and Monitoring Department

ALEPH
PROCESS
SOLUTIONS
INTERNATIONAL

Operation Oil Sludge Project 废油渣处理方案项目

ALEPH
PROCESS
SOLUTIONS
INTERNATIONAL

Operation Project 生活垃圾外处理方案项目

Operation Project 生活垃圾外处理方案项目

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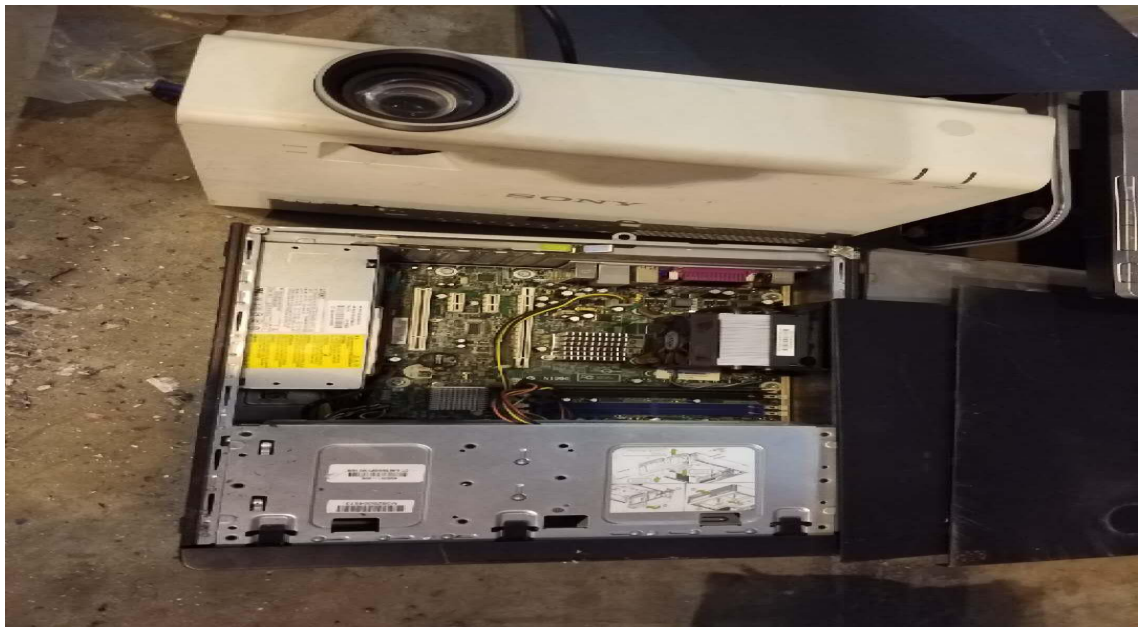
SOLUTIONS
INTERNATIONAL

Operation Project Paint Sludge 油漆危废渣方案项目

ALEPH
PROCESS
SOLUTIONS
INTERNATIONAL

Operation Project E- Waste 电子危废处理方案项目



International Safety Certification 国际安全认证：

PRODUCT OF SINGAPORE

Product of Singapore
新加坡生产的产品

ISO 14001
ISO认证

TÙV SÙD
德国安全认证

Kosher certification
犹太认证

Muslim safety certification
穆斯林安全认证

WMRAS
Waste Management & Recycling Association of Singapore

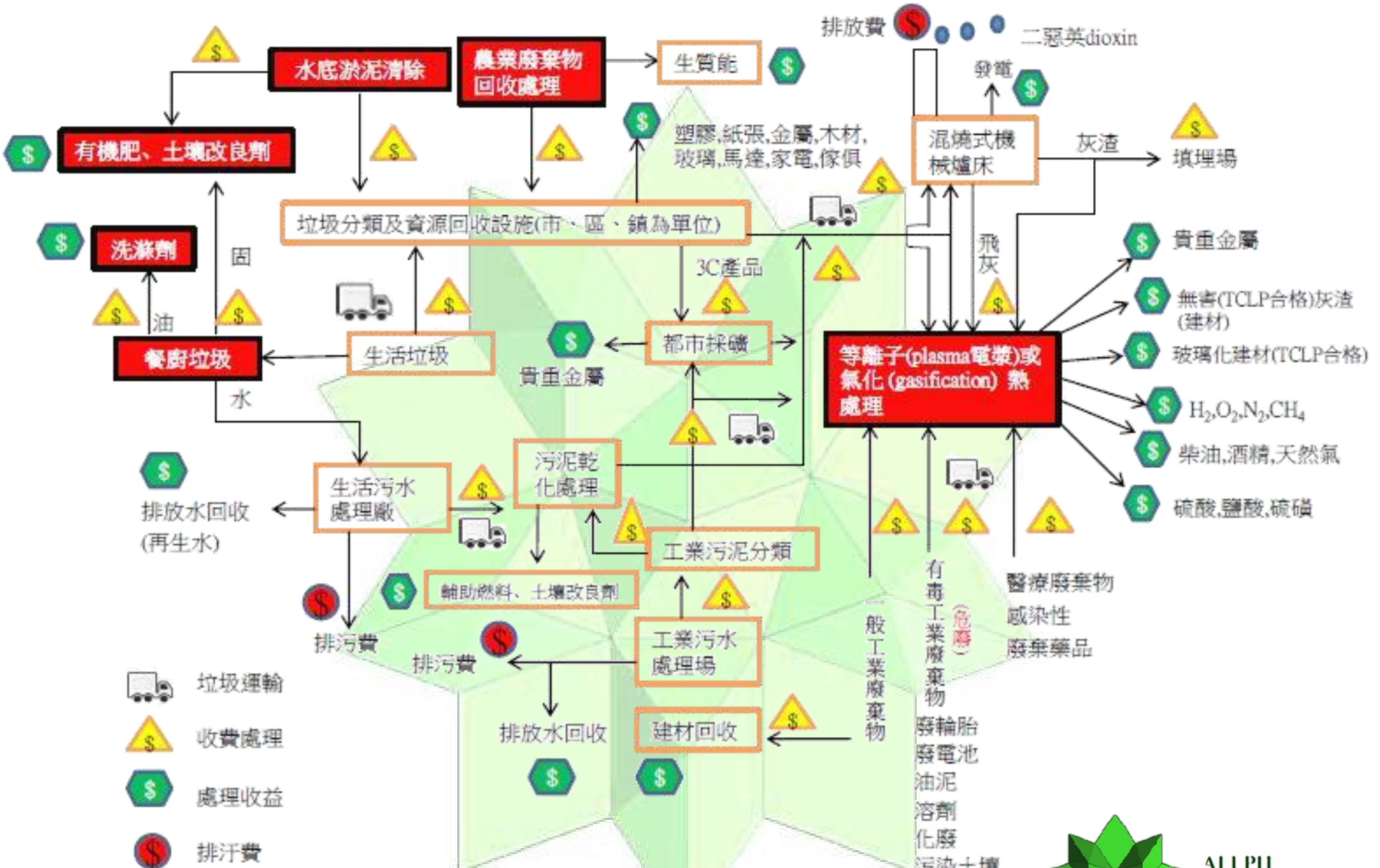
MEMBER Water Quality ASSOCIATION

SWA SINGAPORE WATER ASSOCIATION

IWA International Water Association

2007 FROST & SULLIVAN

Agricultural Compose
农业废物处理
Pest Control & Terminator
害虫防治终止结果
Incinerator and Odor Control
等离子裂解炉和气味控制管理
OUR BUSINESS
经营业务范围
Sewage & Waste Water Treatment System
废水和环境处理系统
Animal & Aquatic Treatment and Feeds
动物和水生生物环境处理和饲料管理
Food Waste Management
食物废物操纵管理



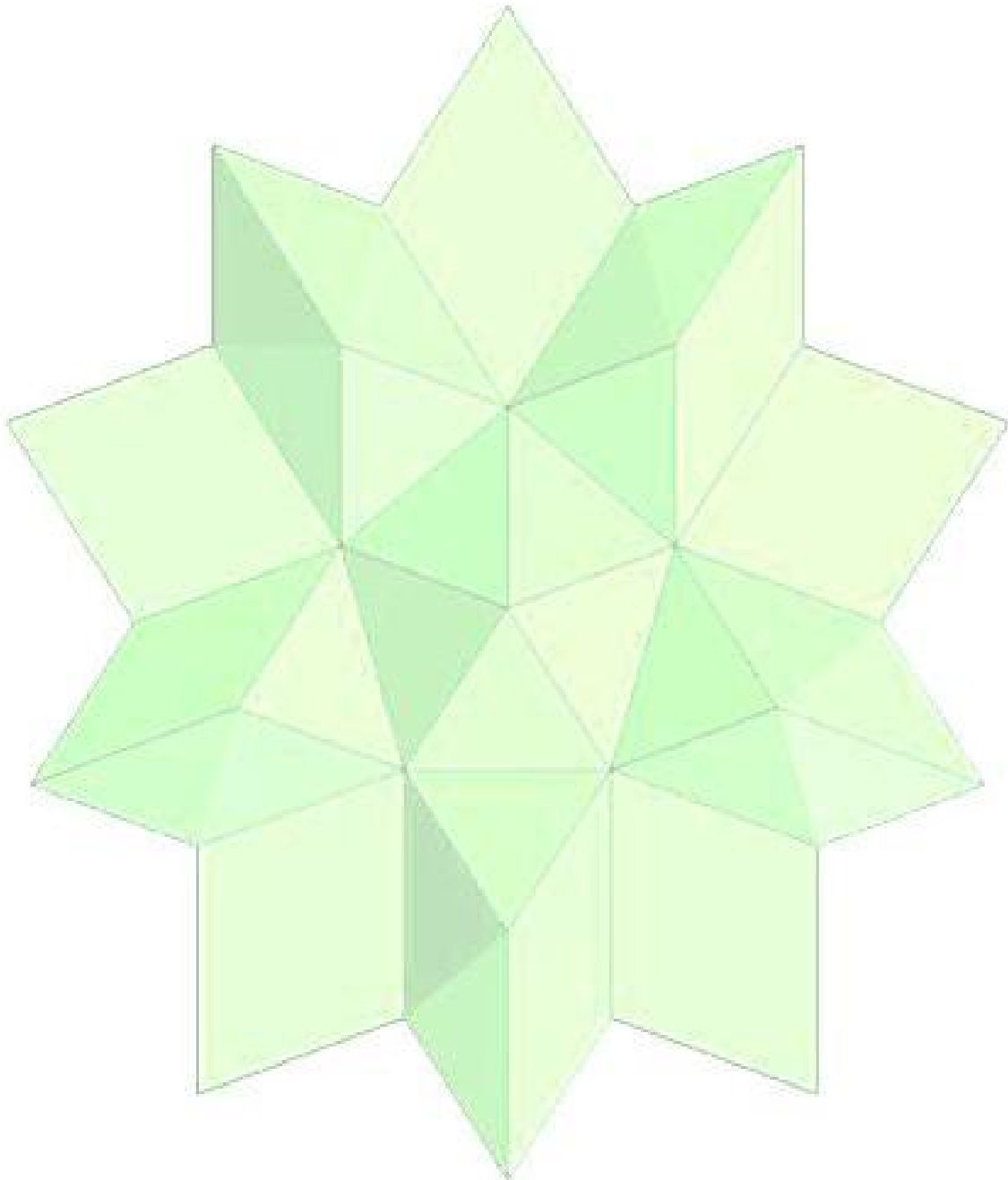
垃圾全回收概念圖

ALI PH
PROCESS
SOLUTIONS
INTERNATIONAL

Thank You!

感谢你

For more information please contact:

Albertteo.aps@gmail.com

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