Woho
| 万 | 泓 | 环 | 保 |

掌握微电解工艺核心技术

山东万泓环保科技有限公司

SHANDONG WANHONG ENVIRONMENTAL PROTECTION TECHNOLOGY CO.,LTD.

山东·潍坊

地 址:山东省潍坊市高新区渤海路2309号金域国际大厦9楼
电 话:0536-8673299　传 真:0536-8673299
网 址:http://www.shandongwanhong.com
邮 箱:sdwh0501@163.com

万泓，掌握微电解工艺核心技术！

Wanhong, masters the core technology of micro-electrolysis!

GL铁碳填料终身不板结！

GL iron carbon fillers do not harden for life!

以OEM/自有品牌服务为主的铁碳填料专业制造商

We are a professional manufacturer of iron carbon fillers with private brand services (OEM).

目 录

CATALOG

01 Company profile 公司介绍

山东万泓环保科技有限公司是一家专注于微电解技术产品的研发及生产的生产型企业，是一家通过环保部门验收的合法生产厂家。公司集科研、技术、生产、销售、服务于一体，在高浓度有机废水的预处理及深度处理中积累了丰富的经验及解决方案。

Shandong Wanhong environmental protection technology Co.,Ltd. is a production-oriented enterprise focusing on the research and development and production of micro-electrolysis technology products. So far, The company is the only one legal production manufacturers passed through the environmental protection department acceptance inspection. The company integrates scientific research, technology, production, sales and service, and has accumulated rich experience and solutions in the pretreatment and deep treatment of high-concentration organic wastewater.

公司具有强大的技术团队，在微电解技术及催化氧化等物化处理技术的研发和工程应用方面处于国内领先水平，先后与多家科研单位及高等院校建产了长期的技术合作关系，特别是与国家重点“863计划”科研团队共同研发的新型微电解填料、铁碳填料取得重大突破，真正解决了板结、钝化及污泥量大的难题，可高效去除废水中的有机污染物、降低色度、提高可生化性，其适应性强、处理成本低，运行稳定，是企业污水处理优先考虑的良好工艺。

The company has a strong technical team. We are in the domestic leading level in the micro electrolysis technology and catalytic oxidation and other physical and chemical treatment technology research and development and engineering application. We have established long-term technical cooperation relations with many scientific research units and colleges and universities, especially with key national “863 project” research team to develop new type of micro electrolysis. We have made major breakthroughs in iron carbon filler, which really solves the hardening, passivation and the problem of the large amount of sludge, and removes the organic pollutants in the wastewater with high efficiency, reduce chrominance, and improve biodegradability. It is the first priority on sewage treatment, strong adaptability, low processing cost and stable running.

中国梦，是属于我们每一个人的梦，万水千山，泓澄渊潇是万泓的梦，梦想一定是跌宕起伏却又精彩满程。截止目前，万泓环保在全国各省市为几十家上市集团公司废水处理提供微电解工艺服务，彻底终结运行板结的世界性难题，是一家运行零板结企业，得到客户的一致认可与好评。未来，公司定不负众望，依然以负责的态度，专业的服务与社会各界朋友一起为呵护我们的碧水蓝天而努力！

China dream belongs to each one of us. The long march, carrying forward the clear deep Wan is Wan Hong ’ dream. The dream must be filled with ups and downs but wonderful .Up to now, Wanhong environmental protection has provided micro-electrolysis process services for wastewater treatment of dozens of listed group companies in various provinces and cities across the country, which has completely ended the worldwide problem of operating zero hardening. Up to now, it is the only domestic enterprise operating zero hardening, and it has been unanimously recognized and praised by customers. In the future, the company will live up to the expectations, still in a responsible attitude, professional service and the community to care for our friends and work together for the blue sky!

- 科研
- 技术
- 生产
- 销售
- 服务
- 经验丰富
- 强大的技术团队
- 高效

02 Micro electrolysis technology 微电解技术

微电解是指：将铁和碳浸于废水中，在酸性条件下，由于铁和碳之间的电极电位差，废水中会形成无数个微原电池。这些细微电池是以电位低的铁成为阳极，电位高的碳做阴极，在含有酸性电解质的水溶液中发生电化学反应。

微电解基于电化学、氧化—还原、物理吸附以及絮凝沉淀的共同作用对废水进行处理，该法具有适用范围广、处理效果好、成本低廉、操作维护方便，不需消耗电力资源等优点。特别适用于难降解、高COD、高含盐量的废水，不但能大幅度地降低COD和色度而且可大大提高废水的可生化性，是国内废水处理中最理想的物化处理工艺。

Micro-electrolysis refers to the process of immersing iron and carbon in waste water. Under acidic conditions, countless micro-galvanic cells will be formed in waste water due to the electrode potential difference between iron and carbon. These tiny cells are made of low-potential iron as an anode and high-potential carbon as a cathode, and react electrochemically in an aqueous solution containing an acidic electrolyte.

Micro-electrolysis is based on the combined action of electrochemistry, oxidation-reduction, physical adsorption and flocculation sedimentation to treat wastewater. This method has the advantages of wide application, good treatment effect, low cost, convenient operation and maintenance, and no need to consume power resources. It is especially suitable for difficulty to degrade, high COD, high salt content of wastewater. It not only can greatly reduce the COD and chromaticity but can greatly improve the biodegradability of wastewater. It is the most ideal physicochemical treatment technology in domestic wastewater treatment.

03 GL iron-carbon filler
GL铁碳填料

在难降解工业废水的处理技术中，微电解技术日益受到重视，并于实际工程中大规模应用。随着技术的发展，市场上出现了多种多样的规整型微电解填料。

随着规整型微电解填料使用越来越多，众多厂家生产的微电解填料弊端也逐一暴露，那就是现在市场上绝大多数规整型微电解填料都出现了粉化、板结，使用时间短的3-5个月板结，时间长一些的1年左右出现板结。微电解填料一旦板结，企业损失的不仅仅是初期投入成本，更严重的是因此而停工停产所带来的无法估量的损失。

时间是检验一切真理的唯一标准，长期大量使用证明，万泓GL铁碳填料是真正不板结的微电解填料！

In the treatment of refractory industrial wastewater, micro-electrolysis technology has been paid more and more attention, and has been widely used in actual engineering. With the development of technology, there are a variety of structured micro-electrolytic fillers in the market.

With the wide use of structured micro-electrolytic filler, micro - electrolytic filler defects of many manufacturers exposed one by one. Now the vast majority of structured micro-electrolytic filler in the market is hardening, from 3-5 months hardening to one year. Once micro-electrolytic filler is hardening, the loss merely the initial investment cost, more serious problem is the inestimable loss caused by the shutdown.

Time is the sole criterion for testing all truth, after long-term and a large number use proved that Wanhong GL iron carbon filler is the only micro-electrolytic packing that is not be hardened!

GL铁碳填料技术参数
Technical parametersof GL iron carbon packing

- **规格：** ≈ 3*5cm
- **外观：**椭圆形
- **比重：** ≈ 1.3 t/m^3
- **比表面积：** ≈ 1.2 m^2/g，
- **物理强度** ≧ 600kg/cm^2
- **化学成分：**铁≈72%，碳≈15%，GL催化剂≈5%，贵金属催化剂≈5%，活化剂≈3%

- **Specification**: ≈ 3*5cm
- **Appearance**: oval
- **Specific gravity**: ≈1.3 t/m^3
- **Specific surface area**: ≈1.2 m^2/g,
- **Physical strength** ≧ 600kg/cm^2
- **Chemical composition**: iron≈72%, carbon≈15%, GL catalyst≈ 5%, noblemetal catalyst≈ 5%, activator≈ 3%

GL铁碳填料技术特点
Technical characteristics of GL iron carbon filler

特点一

采用我公司自主研发生产的新型GL复合添加剂，(GL复合添加剂有多达11中不同的催化剂成分构成)，高级复合铁碳原料加工成形后，通过数字高温淬火窑炉烧结窑变，炉内各个坩埚通道温差控制在10度以内，让烧结的铁碳填料内部形成同素异构结晶铁素体，填料内部形成了均匀的GL复合剂保护系统。

By using my company independent research and development production of composite additives, new GL (GL in composite additives are made up of as many as 11 different catalyst composition). After advanced composite iron carbon raw material processing forming, through digital high temperature quenching furnace sintering kiln furnace temperature control within 10 degrees, the crucible channels for sintered iron carbon packing internal element with heterogeneous crystallization ferrite formation, packing internal formed a uniform GL compound protection system.

特点二

在微电解反应过程中，GL催化剂全程参与，让铁碳填料在PH1以下至PH4弱酸性水运行中，填料微观结构层层剥落，防止填料表面和内部粘性的氧化膜、聚集、粘连、架桥，彻底阻断板结钝化膜的形成，杜绝长时间运行过程中由于铁的腐蚀出现的均流，及时剥离反应过程中生成的金属氧化物和氢氧化物膜，填料层层消耗，阻止填料表面钝化板结，使整个处理过程高效、持久、稳定。从根本上彻底解决了几十年的微电解工艺板结钝化的世界性难题。

In the process of micro electrolysis reaction, GL catalyst participate all the way, making the iron carbon filler under PH1 to PH4 weak acid in the operation of the water, packing microstructure layer upon layer peeling, prevent the packing surface and internal viscous oxide film, aggregation, adhesion, Bridges, completely blocking harden the formation of passive film, put an end to long running due to iron corrosion in the process of flow, timely stripping reaction generated in the process of metal oxide and hydroxide film, packing layers of consumption, prevent packing surface passivation harden and make the whole process is efficient, durable and stable. The worldwide problem of passivation of microelectrolysis process has been thoroughly solved.

天燃气高温烧结

特点三

万泓环保采用国内一流的生产线设备及烧结技术，一体化设备拥有人工土窑无法企及的技术优势。精准数字温控，高温烧结炉最高烧结温度可达1750度！

Wanhong environmental protection adopts the domestic first-class production line equipment and sintering technology, the integrated equipment has the technical advantage that artificial earth kiln cannot reach. Precise digital temperature control, high temperature sintering furnace maximum sintering temperature can reach 1750 degrees!

特点四

GL铁碳填料的运行过程操作简单，无需反冲洗、强制搅拌等费时费力防止板结的落后工艺。从而让企业处理成本降低、工人劳动强度下降，简单轻松操作管理，真正做到懒汉管理模式。也真正做到了不管水质发生任何波动，微电解填料终身都不会板结。

The operation process of GL ferrocarbon filler is simple, and there is no need to backwash, forced stirring and other time-consuming and laborious backward processes to prevent hardening. Thus the enterprise processing cost reduction, labor intensity of workers decline, simple and easy operation management, realizing lazy management mode. Also really achieved regardless of any fluctuations in water quality, micro-electrolytic filler will not harden for life.

GL铁碳填料与其它微电解填料对比

	生产工艺 Manufacturing technique	催化剂成分 Catalyst composition	填料切割表面 Packing cutting surface	填料浸泡效果 Packing soaking effect	板结实验 Harden experiment	工程使用效果 Engineering application effect
万泓GL铁碳填料 Wanhong GL iron carbon filler	天燃气高粹火炉 绝氧烧结、电子温控、火焰旋流平射 1300度高温烧结，填料内外受热均匀 Natural gas high-fire stove Anaerobic sintering, electronic temperature control, flame swirling High temperature sintering at 1300 °C, uniform heating inside and outside the packing	GL复合添加剂 (多达11中不同的催化剂成分构成) GL compound additive (up to 11 different catalyst components)	切割面有明亮金属光泽 切割面金属光泽呈网状结构 The cutting surface has a bright metallic luster The metallic luster of the cutting surface shows a network structure  GL微电解填料切割面	 长期浸泡，水质澄清 Long soak, but water quality clarification	 未板结 Not hardened	 长期稳定运行，处理效果好 终身不板结！ Long-term stable operation, good treatment effect Never harden!
粘结压制填料 Bond pressed filler	粘结压制 无烧结 Binding to suppress No sintering	无催化剂 No catalyst	切割面乌黑一片 切割面无金属光泽 The cutting surface was black The cutting surface has no metallic luster 	 长期浸泡，水质焦黄 表面有大量黄色氧化物附着 Long-term immersion, water is burnt yellow There is a large amount of yellow oxide on the surface	 板结严重！ Serious hardened!	 处理效果不断下降 3-5个月板结失效！ he treatment effect is constant decreasing 3-5 months hardenied failure!
低温过火填料 Low temperature fire filler	粘结压制 低温表层过火 填料受热不均匀 Binding to suppress Low temperature surface heating The filler is not evenly heated	无催化剂 No catalyst	切割面乌黑一片 切割面无金属光泽 The cutting surface was black The cutting surface has no metallic luster 	 长期浸泡，水质焦黄 表面有大量黄色氧化物附着 Long-term immersion, water is burnt yellow There is a large amount of yellow oxide on the surface	 板结严重！ Serious hardened!	 处理效果急剧下降 6个月左右板结失效！ The treatment effect decreases sharply 6 months or so of hardening failure!
砖窑烧结填料 Brick kiln sintering filler	土制回转窑低温烧制 温度800度左右 填料受热不均匀 Low temperature firing of earth rotary kiln The temperature is about 800 degrees The filler is not evenly heated	无催化剂 纯还原铁块 No catalyst Pure reduced iron	切割面纯光亮面 切割面无网状结构 Cut surface is bright No mesh structure on cutting surface 	 长期浸泡，水质焦黄 表面有大量黄色氧化物附着 Long-term immersion, water is burnt yellow There is a large amount of yellow oxide on the surface	 板结严重！ Serious hardening!	 处理效果不断下降 1年左右板结失效！ The treatment effect decreases sharply 1 year or so of hardening failure

郑重承诺
Solemn promise

万泓环保铁碳填料在工程运行过程中如出现板结，本公司无条件退换货！

If Wanhong environmental iron carbon fillers harden in the engineering operation process, the company will change or Refund unconditionally!

GL铁碳填料主要应用于各类高浓度难降解有机废水的预处理及深度处理，可高效去除COD、色度、重金属，提高废水可生化性。

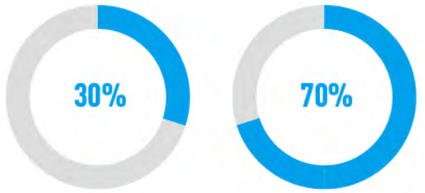
The GL iron-carbon filler is mainly used in the pretreatment and deep treatment of various kinds of organic wastewater with high concentration and difficulty to degrade, which can efficiently remove COD,chroma,heavy metals and improve the biodegradability of wastewater.

应用范围

应用效果

COD去除率在30%-70%之间，部分废水COD去除率高达80%以上。

The COD removal rate is between 30% and 70%.Part of wastewater COD removal rate is as high as 80% or more



适用范围
Scope of application

01 化工废水 Chemical wastewater

02 制药废水 Pharmaceutical wastewater

03 农药废水 Pesticide wastewater

04 橡胶废水 Rubber wastewater

05 染料废水 Dye wastewater

06 焦化废水 Coking wastewater

07 煤化工废水 Coal chemical wastewater

08 化纤废水 Chemical fiber wastewater

09 重金属废水 Heavy metal wastewater

10 电镀线路板废水 Electroplating circuit board wastewater

11 垃圾渗滤液 Landfill leachate

12 酚醛树脂废水 Phenolic resin wastewater

12 项适用范围

实验数据
Experimental data

生产产品	污水种类	原水COD	处理后COD	处理率%
大蒜加工	大蒜废水	12474	8051.97	35.45%
硫酸，水泥，磷肥	硫酸、磷肥废水	1533	608.6	60.30%
生产心脏病药品的原料	医药中间体废水	8000	100以下	98%
医药中间体		13705.29	1489.7	89.13%
磺酸、一水肌酸、胍基乙酸、胍基丙酸等营养强化剂和过氧化苯甲酰等有机过氧化物		2206	834	62%
		氨氮2480	氨氮1080	氨氮55.73%
医药中间体		13201	6300	51.53%
		氨氮2480	氨氮1537	氨氮38.02%
高药效抗球虫盐酸氨丙啉、2-氯-6-氟苯甲醛	医药原料药、精细化工废水	4430	513	88.15%
农药中间体	农药中间体废水	10258	7496.76	26.92%
染布染毛线的原料	染料废水	色度1280	色度320	色度75%
染料	染料分散体废水	3205	948	70.42%
油漆废水	油漆废水	280200	111300	61.28%
兽药产品	兽药生产高盐废水	11302	3960	65%
养猪粪便等混合废水	养殖废水	30387.6	14191	53.30%
化工废水含，酯类，苯类	化工废水	26570	13258	50%
DMF，丙酮，盐酸，丙素酸		50313	26162	48%
三甘醇类		16000	3058.1	81%
含有异酮酸，肼类		3822	1529	60%
精细化工，含有苯酚类东西		880.8	440	50%
香料原材料产品		80105.92	28708.48	64.20%
液碱，双氧水	盐化工废水	86200	41376	52%
镀件清洗水、废电镀液	电镀废水	COD:560 镍:18.49 氨氮:37.1 铜:0.96 TN:195.5 锌:5.89 总铬:19.31	COD:220 镍:0.29 氨氮:28 铜:0.05 TN:161 锌:0 总铬:0	COD:61% 镍:98.4% 氨氮:24.5% 铜:94.8% TN:18% 锌:100% 总铬:100%
MBR产水	MBR产水	870	410	50.60%
焦化废水	蒸氨后废水	3587.3	682.7	80.96%
垃圾渗滤液	垃圾渗滤液废水	66836.87	30375.6	54.55%

04 微电解设备

微电解设备、微电解反应器是微电解工艺运行的废水处理系统，需要有合理的结构及防腐措施。我公司研发生产的新型催化微电解反应器配备合理的布水布气系统、拥有高强度耐腐蚀的设备墙体及良好的承重能力。

本设备在处理难降解的废水（如印染废水、染料废水）、有毒废水（如电镀废水、医院废水等）及其它有机工业废水（如医药中间体废水、化工废水等）时有着显著的效果，具有很强的脱色、去除COD和提高可生化性的功能。

微电解设备的选型

微电解设备一般按客户实际需要定做。设备大小尺寸由两个参数来决定。

每小时处理废水水量

微电解反应停留时间

微电解设备材质

碳钢材质

玻璃材质

碳钢材质微电解设备需要做好内部防腐工艺，通常成本偏高，客户较常选用的是玻璃钢材质微电解设备，经济适用、成本低、使用寿命长。

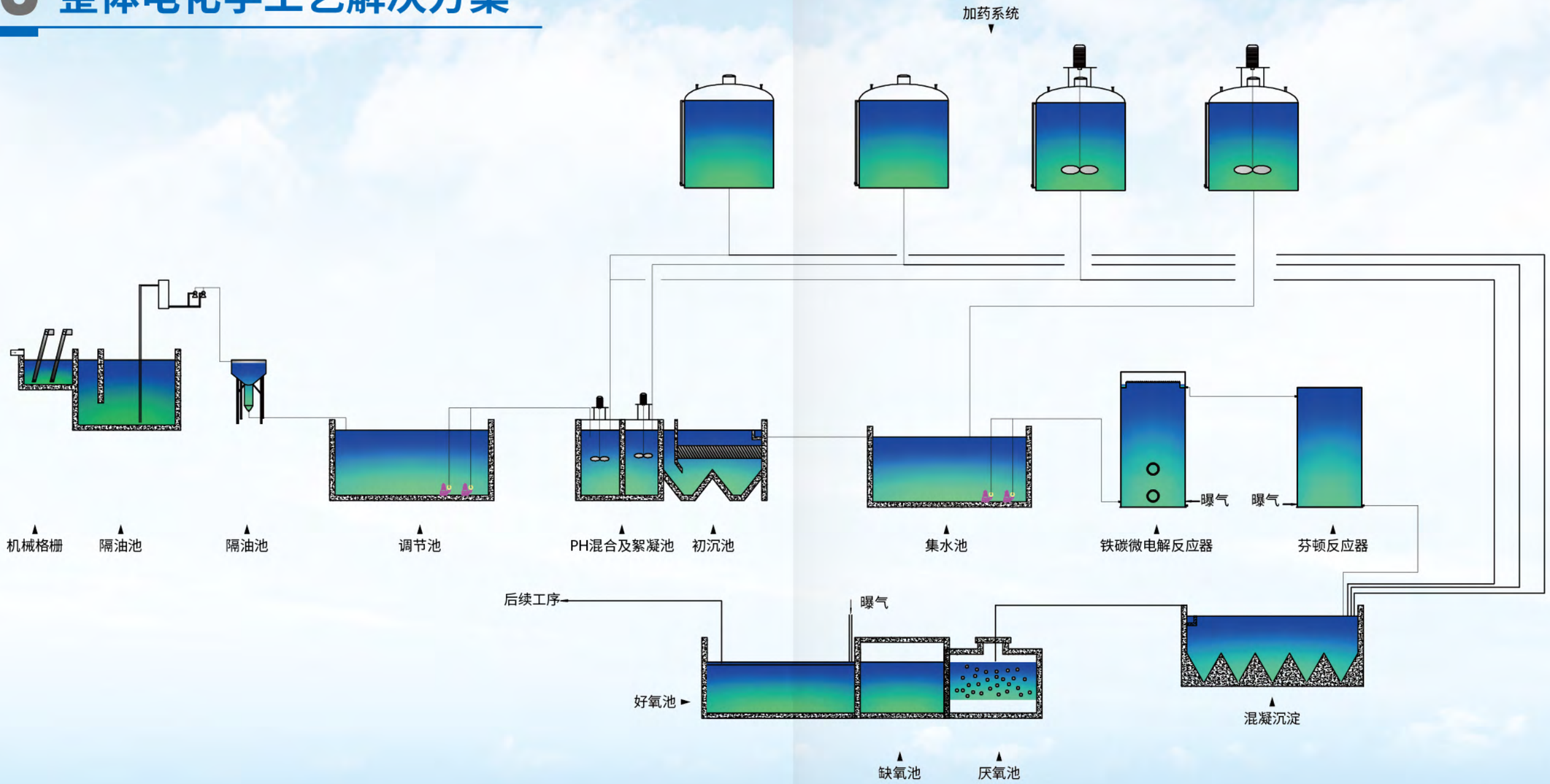
05 多相催化氧化设备

多相催化氧化处理技术是环境领域新发展的一种技术，主要采用以羟基自由基为核心的强氧化剂，通过声、光、电、半导体、多金属催化的共同作用快速、无选择　性、彻底氧化环境中的各种有机污染物。羟基自由基与水中的溶解性有机物反应形成有机自由基；当有氧气存在时，有机自由基与氧气反应生成有机过氧自由基；有机过氧自由基相互反应产生有机过氧化物，而后者通过多种途径进一步分解。该技术对CODcr去除、脱色以及提高废水的可生化性有着显著的效果。其脱色效率为75%-97%，CODcr可去除50%-95%。在对农药废水、化工废水、制药废水的实际应用中，该技术体现了很好的应用效果。

废水可以通过加入一定量的氧化剂，在废水水中的亚铁等离子的催化下，形成更强的氧化性，可氧化去除废水中绝大多数可被其氧化的有机物，为后续的处理达标排放创造了条件。

该催化氧化过程能氧化许多有机分子且系统不需高温高压，对苯类、醇类、酮类、酯类、苯酚、氯苯及硝基酚等有很好的氧化效果。在亚铁离子的催化作用下，随着氧化剂的分解，会产生大量的HO·，利用新生态的 HO·对有机物进行氧化去除。

06 整体电化学工艺解决方案



07 工程案例

水量 5000t/d

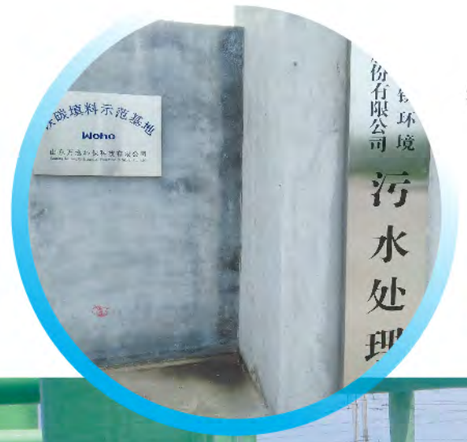
四川北方红光特种化工有限公司

医药中间体废水，2014年起该企业使用万泓GL铁碳填料至今系统运行良好。

工程案例 ENGINEERING CASE

水量 5000t/d

山东默锐环境产业股份有限公司
(综合污水处理厂)



该企业在拥有多家自营的综合污水处理厂，使用GL铁碳填料后系统运行稳定，至今运行良好。

水量 2000t/d

山东华阳农药化工集团有限公司

医药中间体废水，废水经GL铁碳填料处理，最终用达到生化要求，微电解工艺段至今运行稳定。

工程案例 ENGINEERING CASE

水量 2000t/d 鲁西化工集团股份有限公司

乙内酰胺废水，2018年12月使用万泓GL铁碳填料，改造原有微电解工艺单元，使系统处理效率大大提升，至今工艺运行良好。

水量 5000t/d 江苏华峰超纤维材料有限公司

暗紫黑色印染废水，可生化性差。使用万泓GL铁碳填料进行废水处理，至今运行良好。

工程案例 ENGINEERING CASE

水量 10000t/d 淮安盐化新材料产业园区污水处理厂

大型工业园区污水处理厂提标改造工程。使用万泓GL铁碳填料后微电解工艺单元稳定运行，微电解出水COD及B/C值均达到项目运行要求，至今项目运行良好。

水量 10000t/d 辽宁（营口）工业装备产业园

工业园区综合污水处理厂，万泓GL铁碳填料做为预处理单元，处理效果稳定，至今运行良好。

工程案例 ENGINEERING CASE

水量 2500t/d

安徽皖维集团有限责任公司

聚乙烯醇类化工水,万泓多次为该集团企业供应GL铁碳填料，做为废 水预处理工艺单元，项目至今运行良好。

水量 2500t/d

烟台巨力精细化工股份有限公司

精细化工废水，万泓多次为该集团企业供应GL铁碳填料，做为废 水预处理工艺单元，多年应用良好。