Environmental pressure: opportunities and challenges of China's EMM industry

Dr. Ning Duan

China Environmental Science Research Institute

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1、Chinese EMM Industry faces new challenges

Heavy Metal

Ammonia **Nitrogen**

1、 Chinese EMM Industry Faces New Challenges

In July of 2009, Xiang He, a Hunan-based chemical factory, was reported to have caused its surrounding soils severely polluted with Cadmium as they had been illegally making cadmium without any official approval. In this case, 509 people was detected above normal level of cadmium, which is so outrageous that thousands of town folks took part in a protest against it.

1、 Chinese EMM Industry faces new challenges

In August 2009, another some Shanxi-based smelting company caused severe lead pollution and 615 children nearby were found above normal level in the PbB.

In August 2009, in Hunan province, similar case happened again that 1354 children had above normal level of lead in PbB due to the use of inferior EMM by some small enterprises nearby. They used EMM

1、 Chinese EMM Industry faces new challenges

In 2008, Yangzong Lake, one of the nine largest plateau lakes in Yunnan Province, was contaminated by arsenic, which directly endangered 20,000 people in terms of drinking water

in 2008, another arsenic pollution incident happened. At this time, Jinhai Metallurgy Chemicals Company of Liuzhou Huaxi Group caused above normal level of arsenic in 450 people due to the exceeded arsenic-containing waste water it discharged.

1、 Chinese EMM Industry faces new challenges

- Environmentally speaking, heavy metals such as mercury, cadmium, lead, chromium, arsenic and etc. are notoriously poisonous. It is a very serious situation when it comes to heavy mental pollution ,and the situation seems on a worsening trend in some certain areas of China. According to the figures in recent years, metal pollution incidents are in the outbreak period.
- Just take the year 2009, 12 heavy metal pollution incidents including those events mentioned above have been reported to the Environmental Protection Department.
- 4035 citizens in total got excessive lead in PbB, hundreds got excessive cadmium and 32 public crises happened. The threatening toxicity of heavy metals as well as problems like the collateral contradictions between people living upper and people living lower reaches of Yangtze River has apparently affect the stabilization of the society, which rises great concern in the whole society.
- Also, it should be pinpointed that heavy metal pollution has long-term accumulation ability. The events took place in the past showed very well to us how these toxic metals got accumulated and how to work on healthy people.

1、Chinese EMM Industry faces new challenges

❖To better address this heavy metal pollution issue, in 2009, the State Environmental Protection Department, associating with the State Council, implemented a special inspection among potential corporations that may cause mental pollutions. During the inspection involving 9123 corporations, 2183 corporations got punished for being environmentally illegal, 231 corporations were made closed and another 641 closed down for regulation.

Given the prominent heavy mental pollution issue we face currently, the State Environmental Protection Department held a national work conference on how to control and prevent heavy mental pollutions in April, 2009. In principle, they approved the "National Comprehensive Regulation Scheme on Heavy Mental Pollution". It is stressed that this issue be put in a more urgent and important position on governments' agenda and more effective measures be taken to prevent and control its expansion, thus technically exonerate this outstanding environmental problems for public health's sake.

❖The General Office of the State Council has approved and transmitted "the Guidelines on reinforcing Prevention and Control Work Concerning Heavy Mental Pollution Issue", which clearly shows the task, focus and safeguard measures needed such as increasing capital investment.

1、我国电解锰行业面临的新挑战
Chinese EMM Industry faces new challenges

2010年1月25日，环保部部长周生贤在全国环境保护工作会议上的重要讲话指出，2010年我国环保工作的重点之一是集中精力优先解决重金属污染问题：

January 25, 2010, in the important speech of the National Environmental Protection Work Conference,Ministry of Environmental Protection Minister ,Zhou Shengxian pointed out that in 2010 one of the focuses of China's environmental protection work is the priority focus on heavy metal pollution:

- 全面排查重金属污染物排放企业及其周边区域的环境隐患，确定重点防控区域、行业、企业和高风险人群，集中解决一批突出问题；
- To carry out comprehensive investigation and pollutant emissions of heavy metals businesses and the surrounding areas of environmental risks, identify priority prevention and control of regions, industries, enterprises and high-risk groups, and focus on a number of outstanding issues;
- 2010年6月底前将编制完成重金属污染综合防治规划并报国务院批准实施；
  To complete the preparation of integrated pollution prevention and control of heavy metals shall be reported to the State Council approved the implementation plan before the end of in June 2010 ;
- 抓紧制定重金属污染综合防治规划实施考核办法；
- 《“锰三角”地区地表水监测方案》。

Ammonia and nitrogen oxides have been included in "125" constraint index

2010 National Environmental Protection Work Conference held by Ministry of Environmental Protection recently examined the "National Environmental Protection" Shier Wu "Planning the basic ideas" and that "Shier Wu" period of China's total pollutant control program will be "Eleventh Five-Year" single factor reduction into the multi-factor reduction, ammonia, nitrogen oxides emission reduction will be included in the new binding targets for an assessment.

❖"Twelve Five" Plan binding reduction targets, including sulfur dioxide and chemical oxygen demand, ammonia nitrogen, nitrogen oxides, these four pollutants will be included in the forthcoming implementation of the 2010 national resources and environmental statistics index system. By 2015, in the chemical oxygen demand, sulfur dioxide emissions from 2010 based on the reduction of 5-10% would be ammonia, nitrogen oxide emissions into the plan, consider the emission cut by 5-10%.

2, Principles of cleaning production of EMM Industry

The definition of cleaner production

United Nations Environment Program Definition

Cleaner Production refers to the overall environmental strategy of prevention continue to apply to production processes, products and services, in order to increase eco-efficiency and reduce human and environmental risks.

On the production process, raw materials and energy are required to be saved, toxic raw materials need to be eliminated, volume and toxicity of all waste need to be droped;

For products, it's necessary to call for a reduction from raw material extraction to product final disposal of the full life cycle of adverse effects.

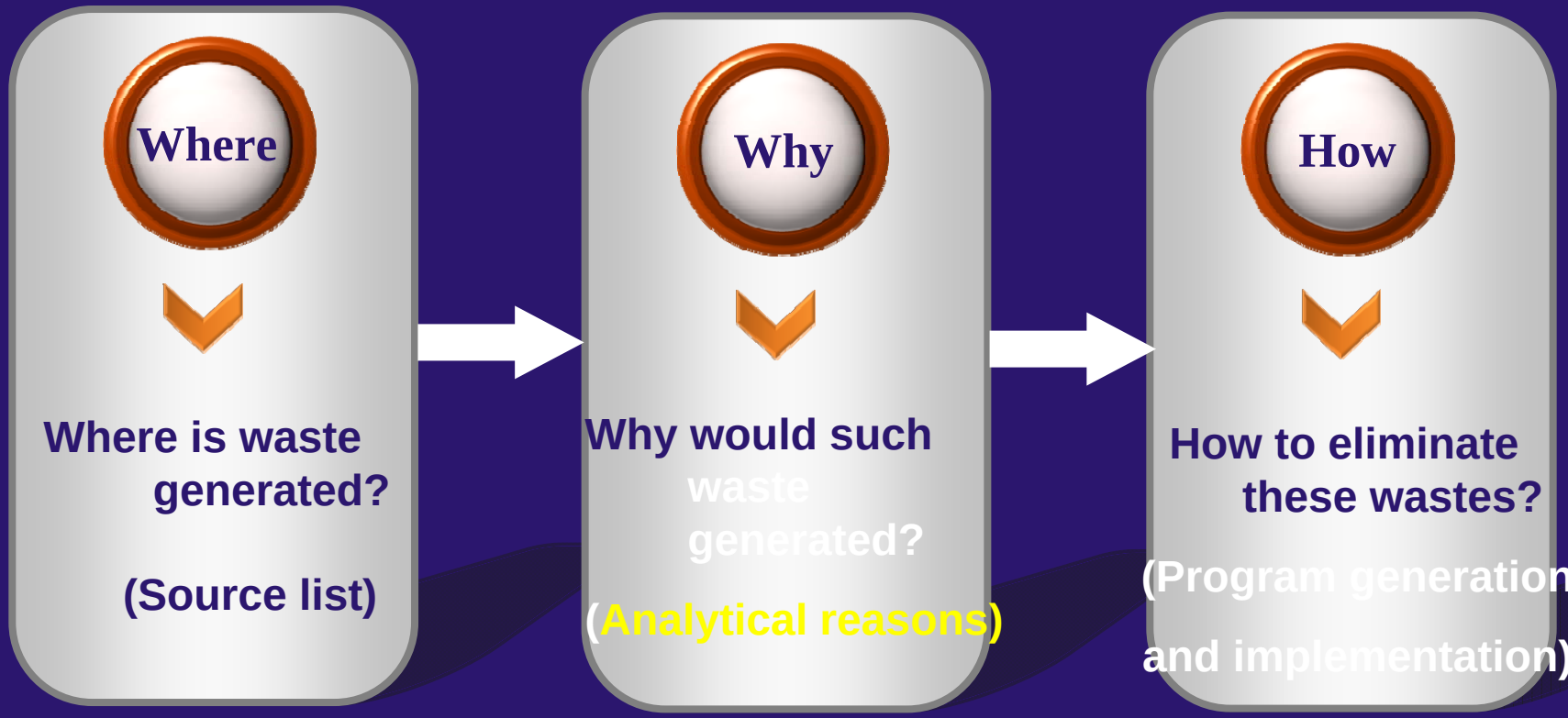
For the service,it's necessary to require the integration of environmental considerations into the design and provide services.

2, Principles of cleaning production of EMM Industry

- "Cleaner Production Promotion Law" in the definition of

Cleaner production is continually referred to improve the design, the use of clean energy and raw materials, the use of advanced technology and equipment, improve management, and comprehensive utilization of such measures, from the source to reduce pollution and increase resource utilization efficiency, reduce or avoid manufacturing, services and products the process of using the generation and emission of pollutants in order to mitigate or eliminate hazards to human health and the environment.

2, Principles of cleaning production of EMM Industry



The three levels of cleaner production

2, Principles of cleaning production of EMM Industry

对于生产全过程产生废弃物的原因分析及清洁生产方案的产生，可从以下8个方面来进行分析和收集。

原辅材料和能源

Raw and appurtenant materials and energy

技术工艺

Technical Process

过程控制

Process control

设备

equip ment

管理

Manag ement

员工

emplo yee

废弃物

Waste

产品

Produ cts

清洁生产的8条途径

Cleaner Production 8 channels

2、电解锰行业清洁生产原理

2, Principles of cleaning production of EMM Industry

矿粉中含锰1.2t

1.2t manganese in mineral powder

软锰矿中含锰

0.19t manganese in MnO

产品金属锰1t

Product manganese 1t

阳极泥带走锰0.175t

Anode mud away manganese 0.175t

锰渣带走锰0.19t

Manganese slag away 0.19t

废水中（排出）带走锰0.025t

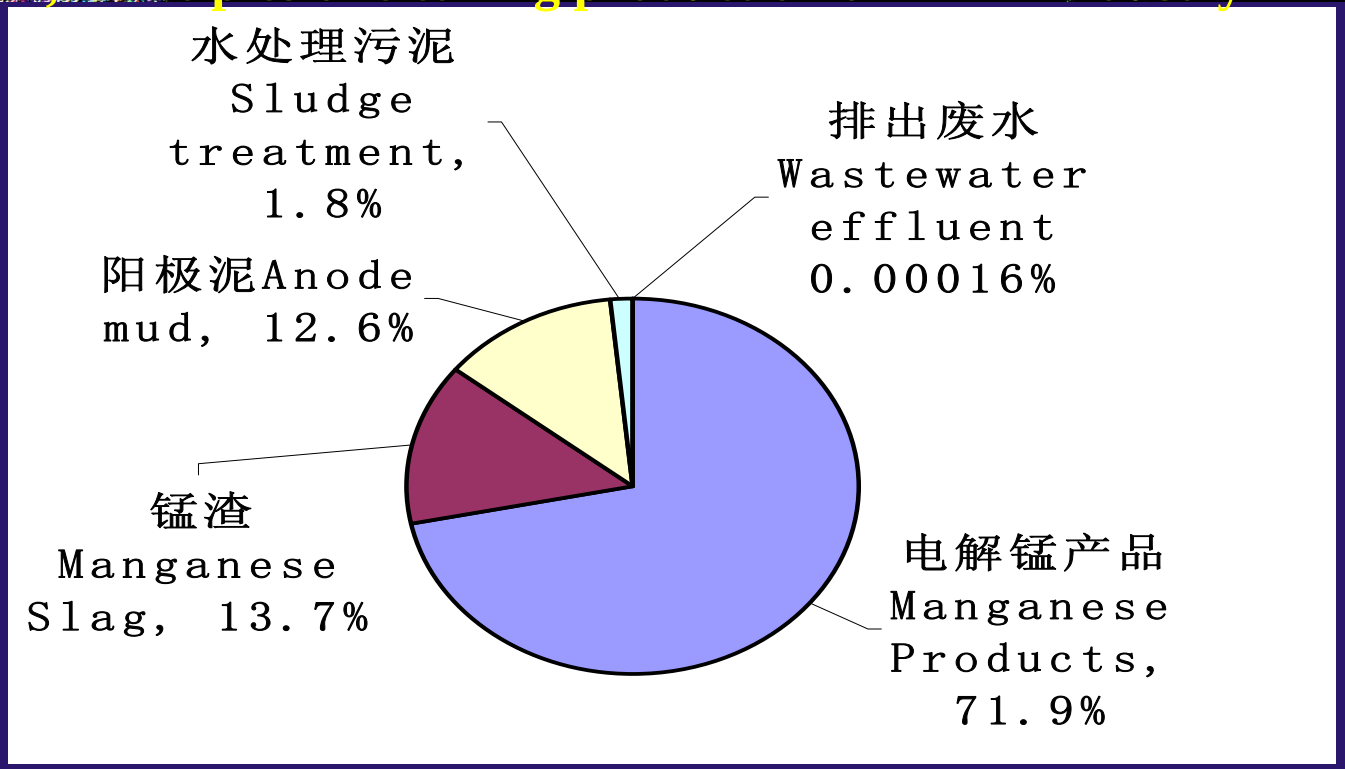
Waste water (discharge) away manganese 0.025t

锰平衡图(以生产一吨电解锰计)

Maganese balance diagram (in order to produce a ton of EMM meter)

2、电解锰行业清洁生产原理

2, Principles of cleaning production of EMM Industry

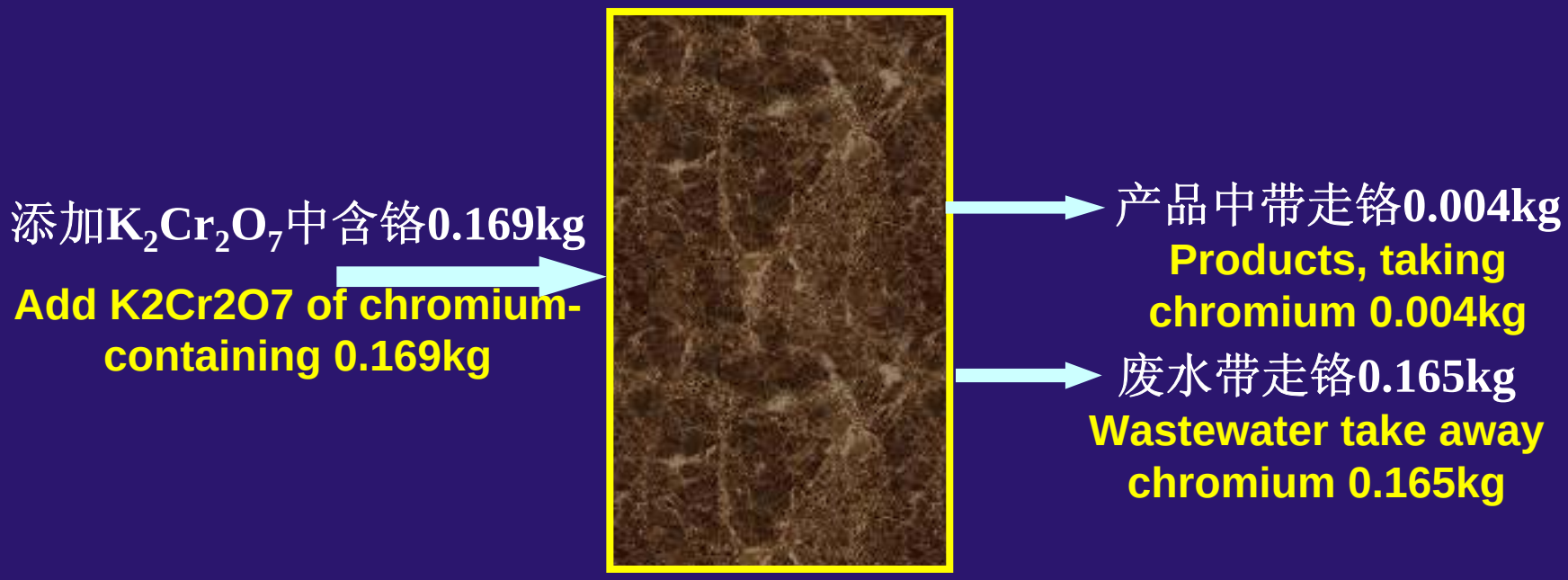


根据锰的物料平衡，进入产品中的锰为71.9%，进入环境的锰为38.1%。

According to the material balance of manganese, manganese came into products is 71.9%, ofmanganese came into the environment is

2、电解锰行业清洁生产原理

2, Principles of cleaning production of EMM Industry

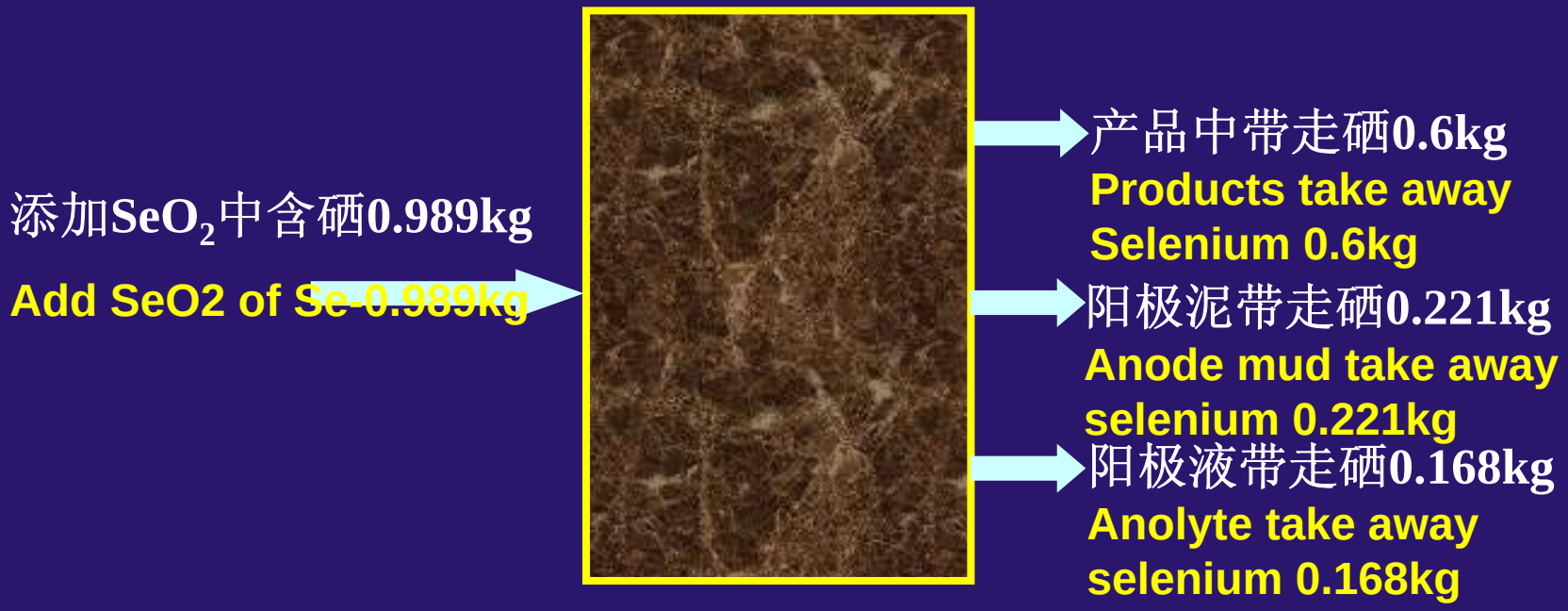


铬平衡图(以生产一吨电解锰计)

Cr equilibrium diagram(To produce a ton of EMM Meter)

2、电解锰行业清洁生产原理

2, Principles of cleaning production of EMM Industry

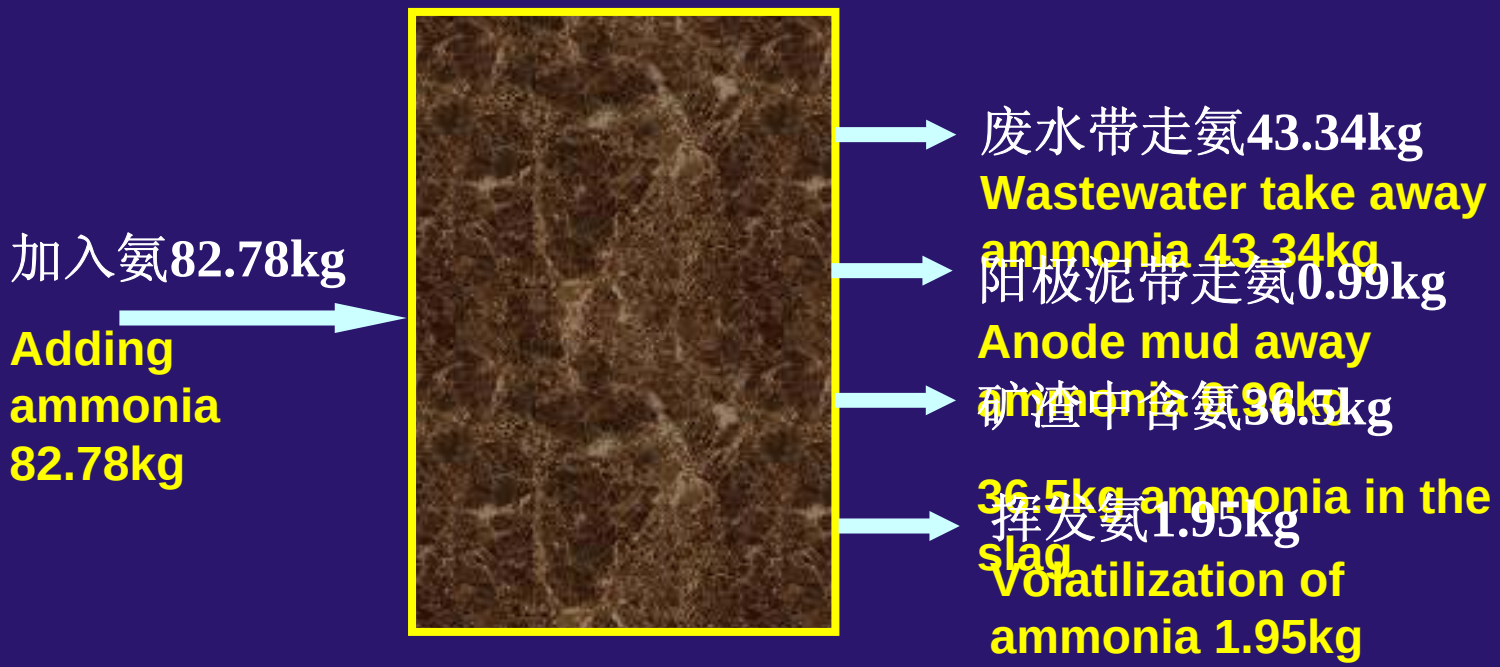


硒平衡图(以生产一吨电解锰计)

Se equilibrium diagram(To produce a ton of EMM Meter)

2、电解锰行业清洁生产原理

2, Principles of cleaning production of EMM Industry

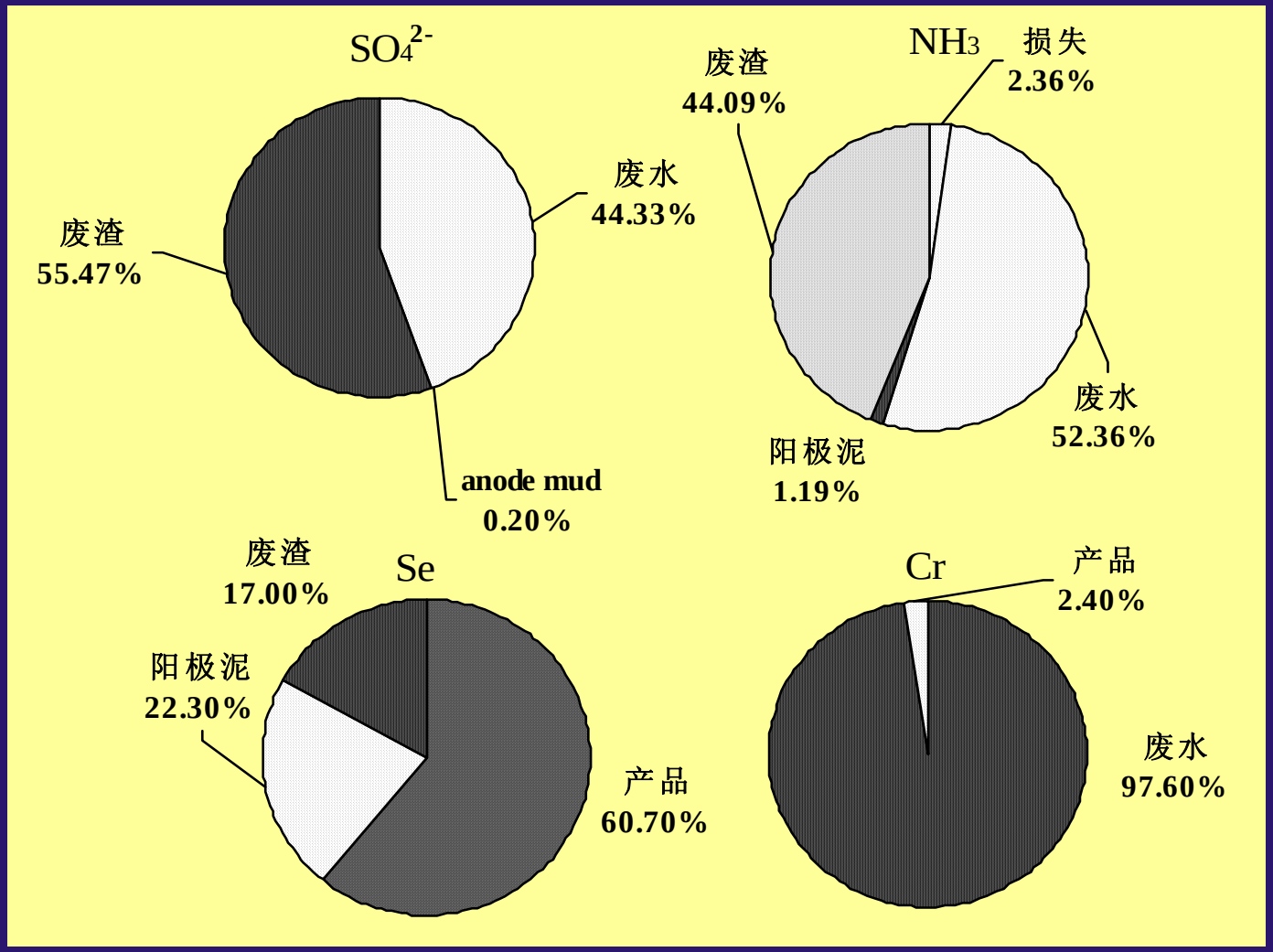


氨平衡图(以生产一吨电解锰计)

Ammonia equilibrium diagram(To produce a ton of EMM Meter)

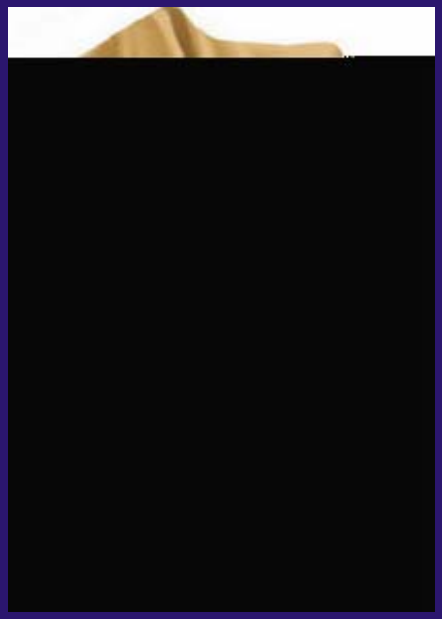
2、电解锰行业清洁生产原理

2, Principles of cleaning production of EMM Industry



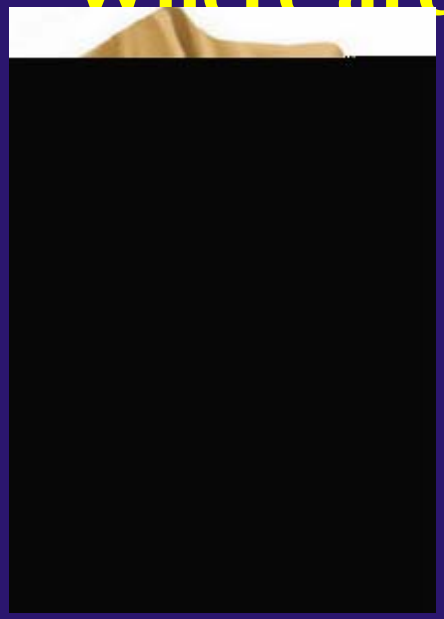
我们的利润流失到哪儿去了？

Where are our profits?



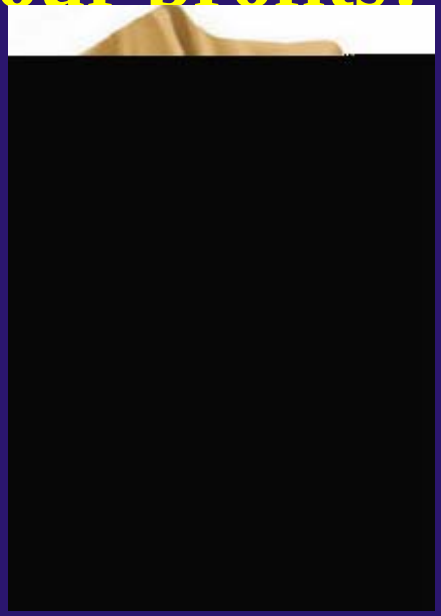
锰

Manganese



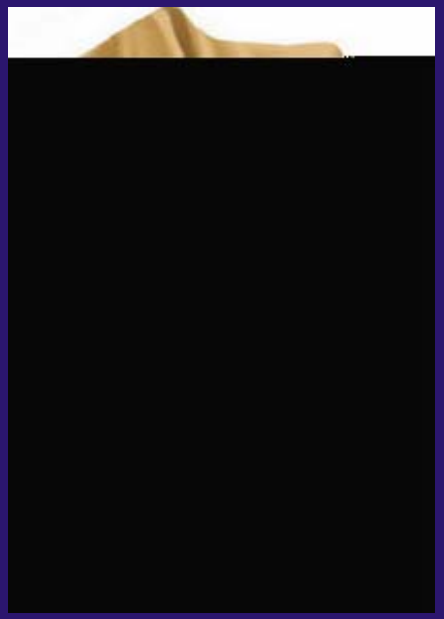
铬

Chromium



硒

Se



氨

Ammonia

清洁生产是电解锰企业的唯一出路

Cleaning production is the only way for EMM business

Cleaner production is a creative environmental strategies, the strategy will all process control, pollution prevention ideas continue to apply to production processes, products and services by strengthening the enterprise management and ongoing advances in technology, in improving the efficiency of resource use ,and at the same time to reduce the generation and emission of pollutants to achieve the unity of economic and environmental benefits.

清洁生产是电解锰企业的唯一出路

Cleaning production is the only way for EMM business

清洁生产

Cleaner Production

清洁生产技术深入到生产过程中，重点是工艺技术的改造，减少生产过程中污染物的产生，减轻末端处理的压力，同时为企业带来经济效益，调动其积极性和主动性，能够在根本上消除环境污染问题。

Clean production technology is deep into the

focusing on the transformation of

末端控制

Endgame

末端控制技术与生产脱节，基建投资大、运行成本高，容易造成二次污染，而且在经济上往往只有投入没有收益，容易导致企业与政府对峙，导致企业偷排漏排和污染反弹。

End of the control technology and

清洁生产是电解锰企业的唯一出路
Cleaning production is the only way for EMM business

3、电解锰行业清洁生产技术
3, Cleaning Producing Technology of EMM Industry

技术路线
Technical line

源头控制、过程减排和末端循环并举

Source control, process simultaneously reduce emissions and end cycle

以污染预防为重点

In order to focus on pollution prevention

以科技减排为核心

Regard emission reduction as the core technology

以工艺无害化、设备封闭化、操作自动化、计量精准化为特征

Regard craft har

3、电解锰行业清洁生产技术
3. Cleaning Producing Technology of EMM Industry

目标
Objective

主要通过推行清洁生产和循环经济技术，到2012年污染物排放大幅下降，二氧化硒和重铬酸钾投加量显著减少，建立起将电解锰行业由高污染、高物耗、低技术水平提升为高科技、高效益和低污染行业的以清洁生产和循环经济技术为主体的污染防治技术体系。

Mainly through the implementation of cleaner production and recycling economic and technical, to render the sharp decline in emissions in 2012, chlorine

industry, from hig

3、电解锰行业清洁生产技术
3, Cleaning Producing Technology of EMM Industry

目标
Objective

到2015年，全面取缔开放式矿石粉碎和矿粉输送系统，推广先进高效固液分离工艺，淘汰铁屑还原、石灰法中和还原的末端废水处理技术，基本完成全行业结构调整，建立起一批工艺无害化、设备封闭化、操作自动化和计量精准化的大型现代化电解锰企业，大幅度提高行业集约化程度。

By 2015, it's necessary to carry out a total ban on open-ore crushing and mineral powder delivery

liquid separation

污染物源头控制技术

Pollutant Source Control Technology

- 在有条件的地方，提倡我国电解锰企业充分利用国外矿石资源，如在沿海和交通便利地区，积极从国外进口高品位锰矿。
- In localities where conditions permit, it's necessary to promote China's EMM ore enterprises to make full use of foreign resources, such as in coastal areas and transportation facilities, and import high-grade manganese ore positively from abroad.
- 积极研发我国贫锰矿富集技术；鼓励采用粗粒干选——细粒湿选的全磁选、浮选等先进选矿工艺技术及装备，多方式分选利用贫锰矿，实现选矿产品的精细化。
- Promote an active research and development of China's poor manganese enrichment technology; encourage the use of coarse-grained dry election - the election of the entire fine-grained wet magnetic separation, flotation beneficiation process and other advanced technology and equipment, multi-way sorting using depleted manganese ore, ore dressing products to achieve refinement.

污染物源头控制技术
Pollutant Source Control Technology

- 加快研发利用二氧化锰矿作原料的先进还原工艺技术及设备。
- **Accelerate the use of the advanced restored technology and equipment of manganese dioxide as the raw material.**
- 加快完善和推广低硒、无硒电解技术，吨电解锰用硒量下降到1.2千克以下。
- **Speed up the improvement and promotion of low selenium, Se-free electrolysis technology, and the tons of EMM with Se decreases to below 1.2 kilograms.**
- 大力鼓励研发、示范和推广无铬钝化技术。
- **Strongly encourage research, demonstration and promotion of non-chromium passivation technology.**

污染物生产过程减排技术

Pollution abating technology in the process of production

- 在制粉工序，推行负压粉碎技术及高封闭性物料收集和运输系统，提高锰矿粉利用率，降低粉尘污染。如节能高效封闭负压磨机＋除尘器＋罐装车系统、节能高效封闭负压磨机＋除尘器＋密闭输送管路等，削减量工业粉尘90%以上。
- **In the milling process, promote the negative-pressure grinding technology, high sealing material collection and transport system; enhance the utilization of manganese powder, and reduce dust pollution. Such as energy efficient vacuum-assisted closure mill + dust separator + canned vehicle systems, energy efficient vacuum-assisted closure mill + dust separator + closed conveyor pipe and so on, reducing the amount of industrial dust over 90%.**

污染物生产过程减排技术

Pollution abating technology in the process of production

- 在化合工序，推广使用酸雾吸收装置，防止酸雾排放。鼓励采用氧气、双氧水等清洁环保型氧化剂，替代部分或全部二氧化锰的使用。
- **In the chemical combination processes, promote the use of mist absorbing device, and prevent the acid mist emissions. Encourage the use of oxygen, hydrogen peroxide and other clean environment-friendly oxidant to replace some or all the use of manganese dioxide.**

污染物生产过程减排技术

Pollution abating technology in the process of production

- 在一榨工序，大力推广先进的高效固液分离工艺技术及装备，如以高效压滤为特征的二段酸浸洗涤压滤技术及其它降低锰渣中可溶性锰含量的同类技术，实现锰渣中（酸）可溶性锰含量低于2%，锰渣二次压榨含水率低于28%，逐步淘汰不能达到上述目标的压滤技术。
- **In a pressing process, vigorously promote the advanced efficient solid-liquid separation technology and equipment, such as the efficient two stage acid leaching technology and other similar technologies of reducing the soluble manganese content of manganese slag, to realize soluble manganese content of manganese slag (the acid) being less than 2%, the second squeezing moisture content of manganese slag under 28%, and gradually eliminate the filter press technologies which can not achieve above objectives.**

污染物生产过程减排技术

Pollution abating technology in the process of production

- 积极推广新型、环保、高效的电解槽，采用新型材料及其工艺技术和设备，提高电解和电流效率，如采用阳极液断流器等技术。在化合工序，推广使用酸雾吸收装置，防止酸雾排放。鼓励采用氧气、双氧水等清洁环保型氧化剂，替代部分或全部二氧化锰的使用。
- **Actively promote new type, environment-friendly and efficient electrolyzer, using new type materials, processing technology and equipment, improving electrolysis and current efficiency, such as the use of anolyte interrupter technologies. In the chemical combination process, promote the use of mist absorbing device, and prevent the acid mist emissions. Encourage the use of oxygen, hydrogen peroxide and other clean environmental oxidants, replacing some or all the use of manganese dioxide.**

污染物生产过程减排技术

Pollution abating technology in the process of production

- 积极推广阴极板出槽—钝化—清洗—烘干—剥离—洗板—浸油—入槽等工序的一体化自动控制流水线，回收阴极板出槽和钝化工序带出的电解液和钝化剂，从源头削减电解车间水污染和粉尘污染，减少废水中锰和铬60%以上，减排金属粉尘70%以上；降低工人劳动强度和可能受到的健康危害，减少操作人员用工70%以上，逐步淘汰传统的劳动密集型出槽和钝化方法。
- **Actively promote the unified automatic assembly line, such as cathode plates out of the groove - passivation - cleaning - drying - strip - plate washer - immersion oil - into the groove. The electrolyte and blunt agent of recycling cathode plates out of slot and passivation processes, from the source to reduce water pollution and dust pollution of electrolysis plant, reduce the waste water more than 60% of manganese and chromium, more than 70% reduction of metal dust; reduce the labor intensity of workers and the possible health hazards, and reduce operator for more than 70% of employment, and gradually reduce traditional labor-intensive out of groove and passivation method.**

污染物生产过程减排技术

Pollution abating technology in the process of production

- 加强节能降耗
- Strengthen energy-saving

（1）加强对企业用水量的监控，杜绝粗放式的水资源使用行为。

（1）Strengthen the monitoring of the enterprises' water consumption, and eliminate the extensive type of water using behavior.

（2）大力鼓励在电解锰企业生产中推广节能节电工艺技术，力争吨含硒产品（碳酸锰矿原料）直流电耗不高于5500千瓦·时，吨无硒产品（碳酸锰矿原料）直流电耗不高于7500千瓦·时。

（2）Strongly encourage promoting energy-saving technology in the EMM production, and strive Se-products (manganese carbonate material) DC consumption being not higher than 5500 kw/h, and Se-free products (manganese carbonate material) DC consumption being not higher than 7500 kw/h.

污染物生产过程减排技术

Pollution abating technology in the process of production

- 产品开发优化
- Product Development Optimization

（1）延长电解锰及锰矿深加工行业产品链，积极开发高附加值锰系产品。

（1）Extend EMM and manganese products' deep-processing industry chain, and actively develop high value-added manganese products.

（2）加快开发电解锰生产过程中钴、镍等伴生贵重金属的提取和回收技术 。

（2）Accelerate developing the extraction and recovery technologies of cobalt, nickel and other associated precious metals in the procession of producing EMM.

废弃物末端循环及处理处置技术

The castoff circle and disposal techniques

- 大力提倡锰渣综合利用技术，推广以锰渣为原料生产建材制品、建材原料、路基材料等技术，鼓励研发大量利用锰渣制备高附加值产品的技术。
- **Strongly advocate manganese slag utilization technologies, promoting manganese slag used as raw materials to produce building productions, building materials and road materials technologies, and encourage technology of a large number of manganese slag making the high value-added products.**

废弃物末端循环及处理处置技术

The castoff circle and disposal techniques

- 鼓励采用锰铬离子回收技术处理末端废水，回收并循环利用废水中的铬锰资源，废水稳定达到《污水综合排放标准》（GB 8978-1996）和地方标准。逐步淘汰铁屑还原和石灰中和方法为主的铬锰废水处理工艺技术。
- Encourage the use of manganese-chromium ion recycling technology dealing with the end of wastewater collection, recycling of waste water in the chrome manganese resources, and stability of waste water to achieve "Integrated Wastewater Discharge Standard" (GB 8978-1996) and local standards. Gradually eliminate the Cr-Mn wastewater treatment process technology mainly by iron filings and lime restored methods.
- 鼓励开发和推广废水中氨氮回收和循环利用技术，加快实现全行业废水氨氮达标排放。
- Encourage the development and promotion of ammonia nitrogen recovery in the wastewater and recycling technology. Accelerate the achievement of industry-wide effluent ammonia discharge standard.

废弃物末端循环及处理处置技术
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- 加强锰渣安全处理处置，规范锰渣库的建设和管理。锰渣库须符合《一般工业固体废物贮存、处置场污染控制标准》（GB18599- 2001）规定。鼓励采用高密度聚乙烯（HDPE）人工膜等高新防渗材料，防止废渣渗滤液对环境的二次污染。
- To enhance the safe handling disposal of manganese slag, regulate construction and management of manganese slag bank. Manganese slag bank must comply with the “General Industrial Solid Waste Storage and Disposal Sites for Pollution Control Standards" (GB18599-2001) requirements. Encourage the use of high-density polyethylene (HDPE) film high-tech artificial impervious material, to prevent the sludge leachate on the environment secondary pollution.

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Thank You！