ATTL ADVANCED MATERIALS CO.,LTD

安泰天龙钨钼科技有限公司

安泰天龙钨钼科技有限公司

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公司网站

微信公众号

ATTL 安泰天龙

VISION

企业愿景

A Global Leading Supplier of Advanced Refractory Metal Materials and Products with Solutions

全球领先的先进难熔金属材料及制品的供应商及解决方案提供者

科技精英 Technological Elite

材料专家 Materials Expert

创新典范 Innovative Model

产业先锋 Industry Pioneer

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R & D, AND MANUFACTURING BASES
研发制造基地

北京海淀永丰基地

- 尖端产品研发基地
- 高新技术创新中心
- 超高精尖产品制造基地
- 国家级工程技术中心
- 净占地60亩

天津宝坻基地

- 高精尖产品研发基地
- 高端产品制造基地
- 特殊异型小批量多品种高端产品制造基地
- 净占地240亩

陕西太白基地

- 电光源用钨钼高端产品研发制造基地
- 与韩国企业进行深度合作的窗口
- 净占地65亩

山东威海基地

- 永丰和宝坻基地研发创新成果转化基地
- 大批量产品制造基地
- 国内客户集中交流服务中心
- 员工培训和疗养基地
- 净占地215亩

ATTL ADVANCED MATERIALS CO.,LTD

安泰天龙钨钼科技有限公司

“安泰天龙钨钼科技有限公司”(以下简称“ATTL”)是央企“中国钢研科技集团”旗下主力上市公司“安泰科技股份有限公司”(以下简称“AT&M”，股票代码 000969)的全资子公司，由原中国钨钼材料精深加工领域的两个领军企业“北京天龙钨钼科技股份有限公司”和“安泰科技股份有限公司难熔材料分公司”合并而成。

ATTL是AT&M中专业从事难熔材料研究、制造和服务的业务单元，承接了中国钢研科技集团在这一领域六十多年不懈耕耘和北京天龙近二十年快速发展所积累的成果，是央企发挥自身优势、整合社会资源、创新发展机制的典范，是中国钨钼材料精深加工领域公认的领导者。

ATTL是中国钨业协会钨材分会的会长单位、中国有色金属协会钼业分会的副会长单位，拥有员工上千人、高工和博士及硕士等高端人才近百名、先进研发制造设备上千台套、经营性净资产近十亿元，在北京中关村创新园区、天津宝坻经济开发区、陕西宝鸡太白县经济园区、山东威海工业新区拥有四个研发制造基地，总占地面积近600亩。

ATTL研发、制造的钨、钼、钽、铌、铼等高性能难熔金属材料及制品不仅广泛应用于航天航空、国防军工、汽车、电子电力、设备制造、金属材料加工、石英和玻璃及玻纤制造、高温工业炉、电光源等传统行业，而且也大量应用于液晶显示、太阳能、核能、核医学、LED照明、大规模集成电路、新能源汽车、消费电子等各种新兴产业。

ATTL是一家具有国际视野、全球布局、国际化的公司，公司以“使钨钼对人类更有价值”为企业使命，秉持“成就客户，惠泽员工，回报股东，造福社会，天人合一，和谐共赢”的企业核心价值观，实行“安全第一、以人为本、科技创新、精益管理”的企业经营方略，不断将“诚信厚德、团结协作、敬业实干、创新自强”的企业精神发扬光大，使ATTL成为受人尊敬、世界一流的钨钼先进材料和高端制品制造商及解决方案提供者。

As a wholly-owned subsidiary of Advanced Technology & Materials Co., Ltd.(AT&M), ATTL Advanced Materials Co., Ltd. (ATTL) is formed by the merger of Beijing Tianlong tungsten and molybdenum Technology Co., Ltd. And Refractory Materials & Ceramics Branch of AT&M. Refractory Materials & Ceramics Branch of AT&M, whose predecessor is Refractory Alloy Laboratory of Central Iron and Steel Research Institute, was founded in 1958. As one of the earliest units devoted to the refractory metal material in domestic market

ATTL owns the largest sized and the most advanced manufacture facilities in the domestic refractory metal fields. The main equipment including hot isostatic pressing machine, cold isostatic pressing machine, plasma spraying equipment, vacuum induction sintering furnace, controlled atmosphere heat treatment furnace, high temperature sintering furnace, ultrasonic testing, universal testing machine, three coordinate measuring instrument, TC600C oxygen-nitrogen analyzer, C600C carbon analyzer etc. ATTL owns the largest sized and the most advanced manufacture facilities in the domestic refractory metal fields. The main equipment including hot isostatic pressing machine, cold isostatic pressing machine, plasma spraying equipment, vacuum induction sintering furnace, controlled atmosphere heat treatment furnace, high temperature sintering furnace, ultrasonic testing, universal testing machine, three coordinate measuring instrument, TC600C oxygen-nitrogen analyzer, C600C carbon analyzer etc.

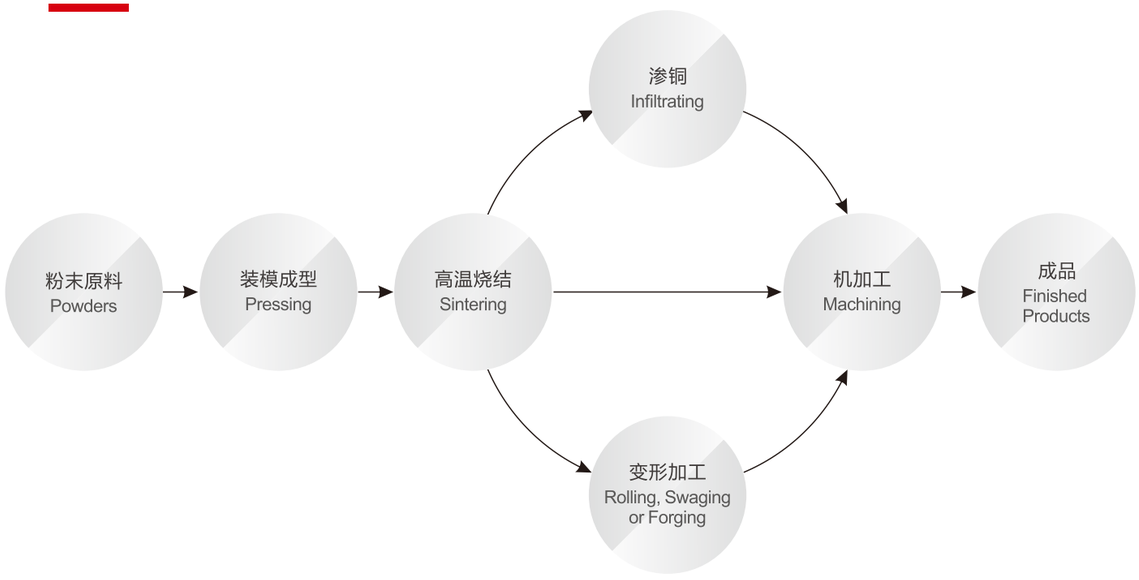
ATTL has four R&D manufacturing bases in Beijing Zhongguancun innovation park, Tianjin Baodi economic development zone, Shaanxi Baoji Taibai county economic park and Shandong Weihai industrial new area, of which the total area is nearly 400 thousand m2. Now, treating the refractory metal materials like tungsten, molybdenum, rhenium, Tantalum and Niobium as the main research direction, ATTL constantly provides services to the global high-end market.

ATTL products are widely applied not only in the traditional industries such as aviation, Aerospace, national defense, automobile, electronic and electric power, equipment manufacturing, metal material processing, quartz and glass fiber manufacturing, high-temperature industrial furnaces and electric light sources , but also in the new and emerging ones such as LCD, solar energy, nuclear energy, nuclear medicine, LED lighting, large-scale integrated circuits, new energy vehicles and consumer electronics.

ATTL is committed to provide customers with consistent, reliable, high quality products, prompt deliveries, responsive customer services and to develop mutually profitable partnerships.

PROCESSING AND EQUIPMENT

工艺及装备



大型热等静压机
Lange-scale HIP

自动压机
Automatic Mold Pressing Machine

烧结炉
Sintering Fumaces

轧机　Rolling Machine

机加工设备　Equipments for Machining

JEOL分析仪 扫描电子显微镜（带能谱仪 SEM EDS）

三坐标测量仪　Three-coordinate Measuring Machine

激光粒度测试仪　Laser Particle Size Diffraction Analyzer

高温拉伸测试设备　High Temperature Tensile Strength Test Equipment

超声探伤设备　Uitrasonic Crack Detector

High Temperature Furnace
高温炉应用

在工业制造过程中，高温炉被广泛用于材料热处理或高温加热工艺。在这些高温炉中，较大部分采用纯金属热室或者带有陶瓷纤维/石墨隔热层的混合热室，金属部分则大多选用钨、钼、铼、钛、钽、铌等金属材料。

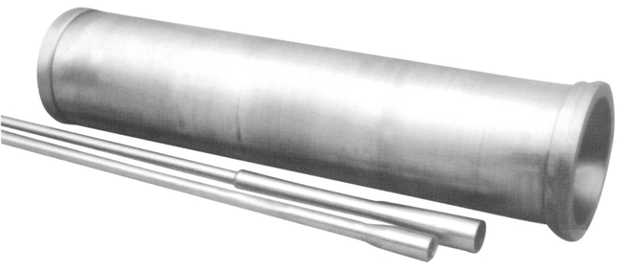
主要应用有：高真空炉、保护气氛炉、热等静压炉（HIP）、石英连熔炉等。

when industrial manufacturing proposes higher requirements upon metal materials in heating process, the high temperature furnaces come into use. In the furnaces, tungsten & molybdenum products are widely used as containers, heat insulation shields, heating elements, sticks and trays for heat treatment,HIP (hot isostatic pressing), quartz melting ,etc.

Product specification
产品规格

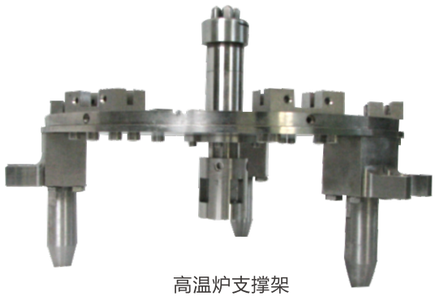
根据按客户要求订制，可为客户提供钨钼发热体材料解决方案

Manufacture according to customer's requests.
We can help you individually with your material choice and solution.

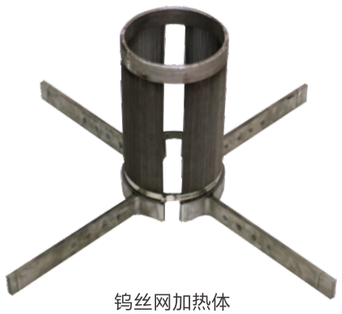


钨管和芯杆
Molybdenum Tube and Mandrel Shalfs

钨料台
Machined Die-Plate



高温炉支撑架
Supporter



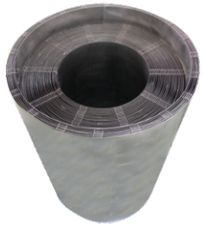
钨丝网加热体
Tungsten Mesh Heater

Hot Zone of Sapphire Growth
蓝宝石长晶炉热场

钨钼的耐高温、低污染特性，使其广泛用于晶体生长用的坩埚和配件，我们可为客户提供各种长晶方法全套蓝宝石长晶炉所需的钨钼部件：

Tungsten and Molybdenum are widely used in growing artificial crystal because of their good properties in high temperature, We can offer all the tungsten and molybdenum parts of whole hot zone used in current sapphire growing methods :

钨发热体 Tungsten Heater



钨/钼隔热屏
Tungsten /Molybdenum
Insulation Shield

上隔热屏
Upper Shield

籽晶夹头
Seed Holder

钨/钼/钨钼合金坩埚
Tungsten/Molybdenum
Their Alloy Crucible

Advantage
我们的优点

大尺寸制造能力，我们拥有全球最大的钨坩埚和钨管烧结制造能力，是全球最大坩埚生产商之一，最大直径可达800mm。我们的产品可以满足您任何型号长晶炉热场需求。同时我们有多重性能产品供您选择，常规密度:18.0g/cm³~18.3g/cm³；特殊工艺密度：大于 18.7g/cm³。我们轧制片材最大宽度可达到2100mm，可以满足您所有金属保温屏制作的片材需求。

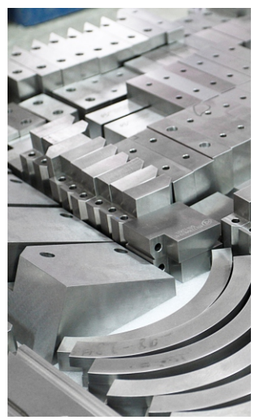
We have the world's largest tungsten crucible and tungsten tube manufacturing capability, maximum diameter 800mm.The regular density is between 18.0g/cm³~18.3g/cm³. Some can reach above 18.7g/cm3 by our advanced process. The width of rolling sheets can be 2100mm.Our hot zone can satisfy all your needs of furnaces requirements.

钨基高比重合金
Tungsten Heavy Alloys

钨基高比重合金是以钨为基体加入少量镍、铁、铜等合金元素组成的合金，具有：密度高(~18.5g/cm³)且可调、吸收高能射线能力强(比铅的射线吸收系数高1/3)、热膨胀系数低(4∽6x10-6/°C)、塑性好、强度和弹性模量高、可加工、可焊接。广泛应用于射线屏蔽防护材料、配重材料、惯性材料、动平衡材料、子母弹穿甲弹弹芯弹丸动能材料、高温模具、砧块等。安泰难熔采用等静压成型技术可生产各种高比重合金大型、异形件，采用挤压、模压、注射成形技术可生产各种小型制品，采用锻造、挤压、轧制技术可生产各种加工态板、棒等制件。

Tungsten heavy alloys(the density is up to 18.5g/cm³)are made of tungsten based with two phase composites of Ni, Fe or Cu as additions to form a ductile matrix. Tungsten heavy alloys have good machining properties, excellent radiation resistance, lower expansion coefficient, high strength and modulus of elasticity which make it extensively used in military equipments, balance weights for submarine and vehicles, aircraft components, nuclear and medical shields , fishing and sport tackles etc. AT&M can produce various big-size tungsten heavy alloy parts by CIP, various small parts by mold pressing, extruding or MIM, various high-strength plates, bars and shafts by forging, rolling or hot extruding.

Main Specification
主要规格



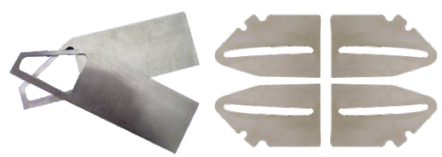
主要规格 Main Specification			安泰牌号 Grades of AT&M						
			弱磁 Thin-Magnetic				无磁 Non-Magnetic		
			AGH-1	AGH-2	AGH-3	AGH-4	AGT-1	AGT-2	AGT-3
钨含量	Nominal Tungsten content	wt%	90	92.5	95	97	90	92.5	95
密度	Nominal Density	g/cm³	17	17.5	18	18.5	17	17.5	18
对应标准	Corresponding Standard SAE-AMS-T-21014		Class1	Class2	Class3	Class4	Class1	Class2	Class3
对应标准	Corresponding Standard ASTM-B-777-87		Class1	Class2	Class3	Class4	Class1	Class2	Class3

注：依据需求参照各类标准生产各种规格尺寸的精加工制件。
Note: According to customers' requirements, various sizes and shapes by different machining standards are available.

About Alice Project of CERN
关于Alice项目

2004年，安泰难熔为欧洲核子研究中心(CERN)的Alice探测器提供了7吨钨合金屏蔽部件，其中最大的钨合金部件单重达1.3吨。由于出色的产品质量和服务，安泰科技被授予CERN2004年度最佳工业奖。

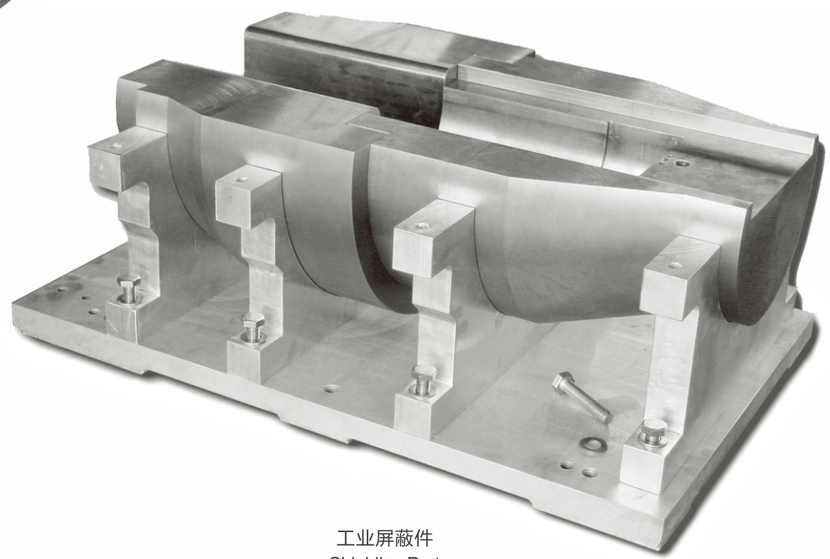
CERN is the European Organization for Nuclear Research, the world's largest particle physics centre. AT&M Refractory Branch is proud of supplying the tungsten heavy alloys for the Accelerators and Detectors.CERN awarded AT&M the excellent supplier for the best quality and excellent service.



多叶光栅　MLC

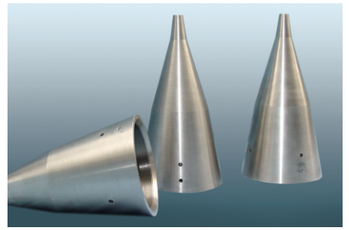
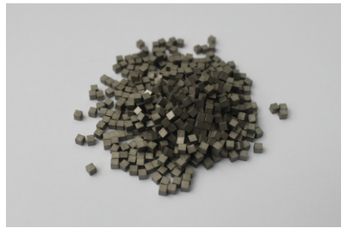
异型制件
Shielding Parts

大尺寸屏蔽件（Φ 500X600mm）
One of the Big Shielding Parts for CERN



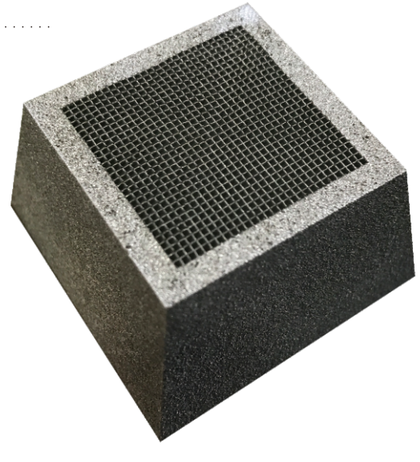
工业屏蔽件
Shielding Part

Kinetic Energy Materials
动能材料

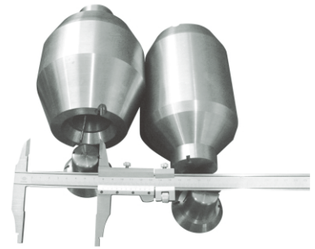




Balance Weight Materials
配重材料

3D Printing Tungsten Part
3D打印产品

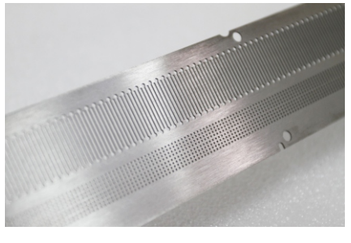
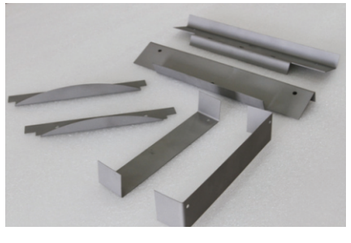
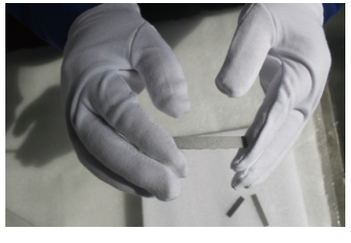


Shielding Parts
屏蔽制件




Source Holders for Mining
勘探业放射固定装置


Tungsten Shielding Plate
钨合金屏蔽片材

Molybdenum boat
钼舟

核燃料钼舟
Nuclear fuel molybdenum boat

钼舟广泛应用于核燃料烧结、真空蒸镀、涂层技术、电子工业、电力工程、电容器烧结、热电偶外壳等，常用于高温热处理行业，如真空炉、氨气炉、工业炉等高温炉中作为盛料熔器。

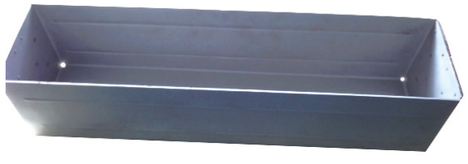
钼舟是核裂变反应所需的核燃料铀块U02的烧结舟皿。

Molybdenum boat is widely used in nuclear fuel sintering, vacuum evaporation, coating technology, electronic industry, electric power engineering, capacitor sintering, thermocouple shell, etc.Molybdenum boat is a carrier of nuclear fuel uranium blocks for nuclear fission reactions.

Product specification
产品规格

安泰科技可根据客户设计制备各种规格、尺寸的钼舟，全面满足客户需求。

AT&M can design and customize molybdenum boat according to cust

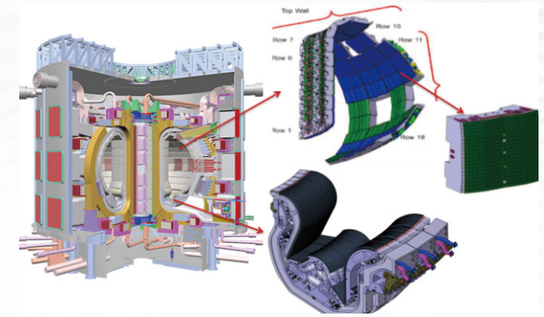


钼合金舟
Mo boat and MoLa boat supplied for customers by AT&M

Tungsten copper composite assembly for partial filter of nuclear fusion device
核聚变装置偏滤器钨铜复合组件

国际热核聚变实验堆(Intemational Thermonuclear Experimental Reactor)是一个能产生大规模核聚变反应的超导托克马克。等离子体环在屏蔽包层的环型包套中，屏蔽包层将吸收50万千瓦热功率及核聚变反应所产生的所有中子。

International Thermonuclear Experimental Reactor(ITER) is a superconducting tokamak that enables large-scale nuclear fusion reactions. The plasma torus is in the ring-shape sheath of the shield blanket. The shield blanket will absorb 500,000 kilowatts of thermal power and all neutrons generated by the nuclear fusion reaction.



Successful cases
成功案例

2012年为中科院提供高性能TZM合金，作为第一壁材 料通过实验测试；

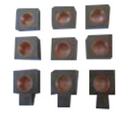
2015年EAST配套WCU偏滤器在实验中承受住了全程烘烤和数十炮的长脉冲放电考验；

为WEST研制的两种PFC模块在HHF高热辐照实验中表 现优异，实验结果全球领先。

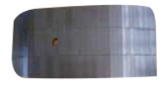
In 2012, AT&M provided a high-performance TZM alloy for the Chinese Academy of Sciences as the first wall material and passed the experimental test;

In 2015, WCU divertor supporting EAST passed the whole process of baking and dozens of guns long pulse discharge test;

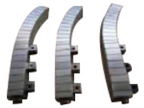
Two PFC modules developed for WEST performed well in the HHF high heat radiation experiments, achieving the world's leading results.



WCu Monoblock



WCu Bending Plate



WCu Tube

Material Introduction
材料介绍

面向等离子体材料是聚变堆反应装置中最受考验和最关键的一种材料，对材料的主要要求：具有低溅射速率、高热冲击抗力、高热负荷能力、低氧存留量、低活化放射性和低衰变余热。安泰科技生产的WCu复合件、TZM材料可以作为面向等离子体的关键材料使用。

Plasma-facing material is one of the most critical materials in the fusion reactor. The main requirements of the material are with low sputtering rate, high thermal shock resistance, high heat load capacity, low tritium retention, low activity radioactive and low decay heat.Tungsten-copper composite parts, TZM materials produced by AT&M can be used as the first-wall materials.

Molybdenum Electrodes for Glass Melting

玻璃窑炉用钼电极

安泰科技在国内率先研究成功的钼电极及应用技术，用于玻璃纤维拉丝炉，玻璃窑料道，代替昂贵的铂电极，该技术1981年获国家发明三等奖，目前已在全国推广应用。我单位自行研制、开发、生产的电加热和电助熔钼电极及相应冷却系统设备，为国内外顶尖玻璃生产厂商服务多年，得到了广大客户的信赖和一致好评。

AT&M takes the lead in researching and producing molybdenum electrodes and its application techniques in China, which won the 3rd Grade Prize of State Invention Award. The electric heating and electric assistant melting molybdenum electrodes and corresponding water cooling system are supplied to world famous glass manufacturers in the world, from which we get very good reputation.

玻璃窑炉用钼电极主要规格
Main Specification of Molybdenum Electrodes for Glass Melting

直径 Diameter (mm)	直径公差 Dia Tolerance (mm)	螺纹规格 M (Cylindrical)	重量 Weight (kg/m)	长度公差 Length Tolerance
31.75	± 0.3	M22 x 1.5	8.1	≤1000=±5% >1000=± 50mm
48	± 0.3	M24 x 1.5	18.5	
50.8	± 0.4	M27 x 3	20.7	
54	± 0.4	M36 x 3	23.4	
63.5	± 0.5	M36 x 3	32.3	
76.2	± 1.0	M42 x 3	46.5	
88.9	± 1.0	M58 x 3	63.3	

注：所有规格均可通过机加工满足客户高精度的要求。 Note: We can keep the high tolerance of all dimensions by machining.

Parts of Ion Implantation Source Assembly

离子注入机离子源零部件

安泰科技利用优良的生产工艺生产具有国际水准的钨、钼、钽、BN和陶瓷等材质的离子注入机离子源零部件。

AT&M is dedicated in supplying world-class ion implant components made of special materials such as W,Mo,Ta,BN, and Ceramic by high-level machining process.

MOCVD Heater and Core Parts

MOCVD加热器以及相关零部件

安泰科技为多家知名的设备生产商提供MOCVD加 热器以及相关零部件。为设备生产商及终端MOCVD设 备使用者降低成本，提高竞争力。

AT&M supplies MOCVD heater and relative parts. Our goal is to save cost and improve the competitiveness for you.

· 提供MOCVD加热器整套产品及解决方案
· 配套MOCVD设备核心零部件
· MOCVD零部件修复、优化
· Provide the whole set of the heater and the solution
· Equip with MOCVD core parts
· Maintain and optimize MOCVD

Product Specification 产品规格

名称 Name	主要型号 Main Model	主要规(mm) Main Specification
纯铼片 Pure Rhenium Sheet	>99.99%Re	0.1min.x (10~50) x2000max.
纯铼条 Pure Rhenium Strip	>99.99%Re	14X14X400
纯铼棒 Pure Rhenium Rod	>99.99%Re	Φ5~Φ100X600
钼铼合金丝 MoRe Wire	Mo-14%Re	Φ0.1,Φ0.2,Φ0.25, Φ0.3,Φ0.35,Φ0.5
钼铼合金棒 MoRe Rod	Mo-42%Re	Φ1~Φ30XL
钼铼合金片 MoRe Sheet	Mo-44.5%Re	0.2min. x (10～350) x 600max.
钼铼合金箔 MoRe Foil	Mo-47.5% Re	0.04min.x100xL
钨铼热电偶丝 Tungsten-Rhenium Thermocouple Wire	WRe3/25 WRe5/26	Φ0.1,Φ0.2,Φ0.25, Φ0.3,Φ0.35,Φ0.5
钨铼合金丝 Tungsten-Rhenium Alloy Wire	WRe3%, WRe5%, WRe25%, WRe26%	Φ0.1,Φ0.2,Φ0.25, Φ0.3,Φ0.35,Φ0.5
钨铼合金棒 Tungsten-Rhenium Alloy Rod	WRe3%, WRe5%, WRe25%, WRe26%	Φ1~Φ17
钨铼合金片 Tungsten-Rhenium Alloy Sheet	WRe3%, WRe5%, WRe25%, WRe26%	0.2min. x (10～350) x 600max.

Rhenium and Rhenium Alloy

铼及铼合金

材料性能

Material Characteristics

· 高密度，理论密度21.02g/cm³
· 高熔点，3180°C
· 极强的抗化学腐蚀性能
· 铼可以与钨、钼等形成合金。钨铼和钼铼合金具有良好的高温强度和塑性，可加工成板、片、线、丝、棒、箔

· High density, theoretical density is 21.02g/ cm³
· High melting point,3180°C
· Strong resistance to chemical corrosion
· Rhenium can be alloyed with tungsten and molybdenum. With high temperature strength and plasticity, tungsten rhenium and molybdenum rhenium alloys can be processed into plates, sheets, rods, wires or foil.

钨铜、钼铜合金产品
Tungsten (Molybdenum) Copper Alloys

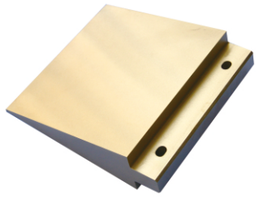
钨（钼）铜材料综合了钨（钼）和铜的优点，具有耐高温、耐烧蚀、强度高、比重大、传导性好，易于切削加工，并具有发汗冷却特性，作为电触头材料、电极材料、电子封装材料以及火箭、 导弹特殊用途材料等广泛应用于机械、电力、电子、冶金、航空航天工业。

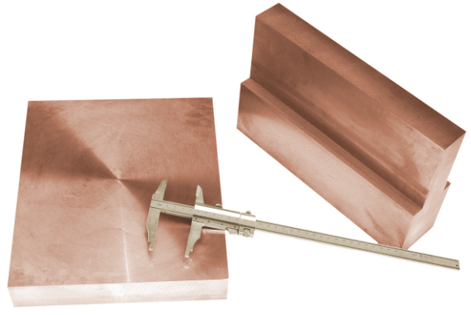
安泰难熔采用不同工艺生产铜含量5%-95%的各种不同成份的二元、三元钨（钼）铜合金，采用热等静压成型工艺可生产各种大、异型制品，模压成型、挤压成型和注射成型可生产各种片材、 杆材、管材和形状各异的小制品；采用轧制工艺可生产各种板材及多元复合板材。

Tungsten (molybdenum) copper alloys produced by sintering and infiltration methods have ideal conductivity, good machining property, high tensile strength, high fracture toughness, high ablation resistance and low thermal expansion coefficient in elevated temperature. WCu, MoCu alloys are widely used in astronautic,aeronautic,electric and electronic, EDM machine, metallurgy industry.

AT&M can provide two phases or three phases tungsten (molybdenum) copper alloys which the copper content varied from 5% to 95%. AT&M can produce various big-size WCu parts by CIP, various small parts by mold pressing, extruding or MIM, various thickness plates by rolling.

钼铜柱 MoCu Cylinder





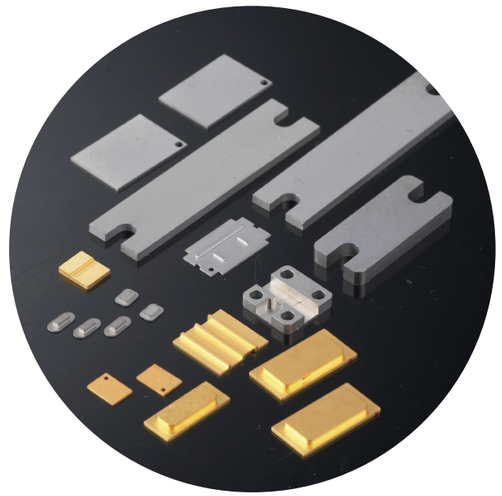
钨铜板
Tungsten Copper Plates

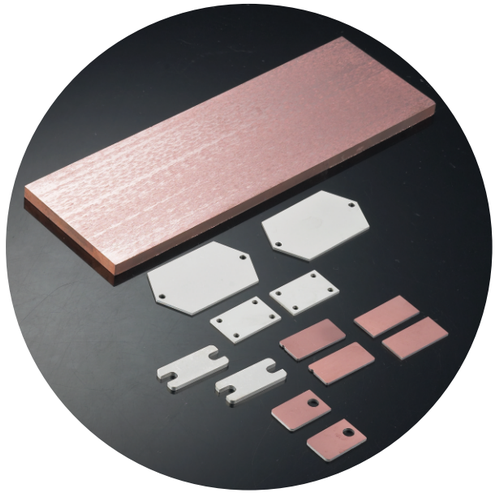
Heat Sink
热沉材料

在功率电子器件和电路中散热是一个不可避免的副产品。热沉 材料有助于消散芯片热量，将其传输到周围的空气中。

钼铜、钨铜、CMC和CPC材料结合了钼、钨的低热膨胀率和 铜的高热导率，可有效释放电子器件的热量，有助于冷却IGBT模 块、RF功率放大器、LED芯片等各种产品，可用于大规模集成电 路和大功率微波器件中作为绝缘金属基片、热控板和散热元件（热 沉材料）和引线框架。

我们可以提供各种比例的钨铜（WCu10~WCu50、钼铜MoCu15~MoCu60、铜/钼/铜（141,131,121,111"铜/钼铜/铜（141,232,111,212）和多层铜/钼/铜（51515）,表面电镀Ni、NiAu或裸片。





In the power electronic devices and circuit, heat dissipation is an inevitable by-product. By transferring the heat to thesurrounding air, heat sink materials contribute reducing the heat of the chip.

Molybdenum copper, tungsten copper, CMC and CPC materials, combined with low thermal expansion rate of molybdenum,tungsten and conductivity of copper heat, can effectively release the heat of electronic device and contribute cooling IGBT module, RF power amplifier, LED chips and other products. They are thus applied as a metal substrate, thermal control andheat insulation components (heat sink materials) and the lead frame in large-scale integrated circuit and high power microwave devices.

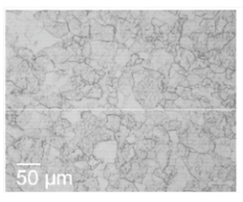
We can offer WCu(WCu10~WCu50), MoCu(MoCu15~MoCu60), Cu/Mo/Cu(111,212,51515) and Cu/MoCu/Cu(141)platingNi, NiAu or non-plating.

Pure Molybdenum Target
纯钼靶材

对用于TFT-LCD屏幕的薄膜晶体管来说，钼涂层是其重要的组成部分。运用钼涂层，能够瞬间控制个体图像点（像素），从而确保特别清晰的图像质量。

Molybdenum coatings are the crucial components of the thin-film transistors used in TFT-LCD screens. These provide instantaneous control of the individual image dots (pixels) and consequently ensure particularly sharp image quality.

Generation	Target Size (mm)
G8.5	2650X210X18
G7	2300X200X16
G6	1950X200X16
G5.5/5	1950X1580X14 / 1700X1431X14
G4.5/4	1200X1130X10
G3	950X860X16

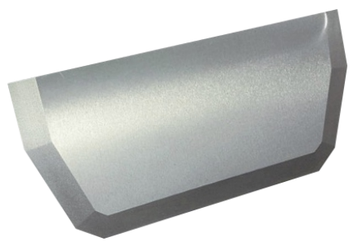


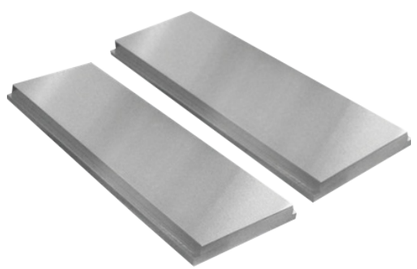
Purity: 3N5
Grain size: < 100 pm
Density: >10.15g/cm³
(>99%)

- 我们可以提供全世代线高纯钼溅射靶材。
  We can offer high-purity planar Molybdenum target for all generation line.
- 我们还可以提供旋转钼靶材。
  Molybdenum rotary target is available too.

Molybdenum Niobium Target
钼铌靶材

在触摸屏中，钼铌(MoNb)用于极耐腐蚀的ITO传感器金属接线。
Molybdenum-Niobium (MoNb) is used as corrosion -resistance wirings of the ITO sensor in touchpanels.





密度 Density (%)	> 99.5
纯度 Purity (%)	> 99.95
微观结构 Microstructure	单项材料、无氧化物 single - phase material, oxide - free

安泰科技通过数年的研究开发工作，采用热等静压工艺方法，自主开发了满足高端用户需求的钼合金靶材。目前已获得两项国家发明专利授权，具有完全自主知识产权。

Through several years of research and development, AT&M has indepentently developed molybdenum alloy materials to meet the demand of high-end users by HIP technology.

Cermet Hot Extrution Die
金属陶瓷热挤压模具

金属陶瓷热挤压模具具有良好的热强性和红硬性、模具热稳定性、耐磨性好、高温工作时不氧化、不变形、不挂料，挤压产品精度高、表面质量好、成品率高等特点。广泛应用于铜材、钛材、不锈钢和铝合金的棒材、管材、线材、异形材的热挤压加工。

Ceramet Hot Extrution Die has many good properties: high thermal stability and abrasive resistance, no oxidizing, no deformation and no hanging up in high temperature, high precision and surface quality for finish products, high surface quality. Now Ceramet Hot Extrution Die is widely used in hot extrusion of copper and its alloys,Ti, stainless steel and Aluminium alloys.

Boron Nitride Ceramics
氮化硼陶瓷

氮化硼复合陶瓷喷嘴主要应用于非晶带材行业，尤其是在超大规格非晶宽带带材的生产应用中具有显著优势。该产品是氮化硼复合陶瓷材料通过热压工艺制成，产品具有结构致密均匀，易加工，不与金属熔液反应，耐磨、耐高温、抗氧化、热膨胀小等诸多优点。

Boron nitride composite ceramic nozzle is mainly used in the industries of amorphous strip, especially in the broadband type. Due to hot pressing process, the product is uniformed, compact and easily processed. It does not react with metal solution. It has many advantages such as good resistance to high temperature and oxidation and small thermal expansion.

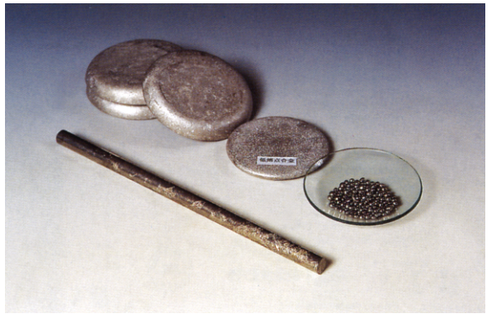
Silicon Nitride Ceramics
氮化硅陶瓷

具有热稳定性能高、抗氧化能力强、耐侵蚀性能好、电绝缘性能优异及产品尺寸精度高等优良性能，广泛应用于机械轴承制造、多晶硅制备、有色冶炼及机械密封等。

It is characterized by high thermal stability and oxidation resistance, good erosion resistance, electric insulation performance and high dimensional precision. It is widely used in mechanical bearing manufacturing, polysilicon manufacturing, nonferrous smelting and mechanical sealing, etc.

安泰难熔生产的低熔点合金是一种铋基共晶合金、该合金熔点极低，很容易铸型，凝固后即可使用。用热水热油浸泡或低温烘烤，很容易将其从型模、铸模、固定夹具或零件中清除并回收，可反复使用。根据客户要求，还可生产不同熔点的铋基、铅基、锡基低熔点合金。

This is a bismuth-based eutectic alloy. It can be cast easily and ready for use soon after freezing. Because of its low milting point(70°C), by simply dipping into hot water or oil or heating in an oven at low temperature, it can be removed from the molds, patterns, fixtures etc, It can be recycled and used for many times.



Bismuth Powder 铋粉

聚能弹粉末药芯罩添加剂
纯度：>99%
粒度：-100+200目、-200+300目、-300目、特殊规格面议

Additive of shaped charge cover
Purity: >99%
Particle size: -100+200M,-200+300M,-300M
(Special type according to users' demand)

Cadmium Plate 镉片

纯度：>99%
规格：0.1~2X250XL，特殊规格面议
用途：屏蔽热中子

Purity: >99%
Specification: 0.1~2X250XLmm
(Special type according to users' demand)
Application: Shield for thermal neutron

Applications 用途

1、放射治疗专用挡块；
2、弯曲管材和其它型材用内、外支撑填充物;
3、切削、磨削加工时锚定零件的支撑物；
4、不同物质间的粘合物；
5、电气保护或消防用安全装置；
6、小批量生产用模具、铸造用器具；
7、热传递介质。

1. Customs-made mantle blocks in radiation therapy
2. Internal and external support for bending pipes and other forms
3. Anchoring components and parts for machining or grinding
4. Dies for limited production
5. Foundry device
6. Heat-transfer medium

钽及钽合金（如Ta-2.5W、Ta-10W、Ta-40Nb等）具有高熔点、耐腐蚀、冷加工性能好等特点，广泛应用于航空和宇航工业、高温技术、原子能工业以及化学工业中，主要用来制作超音速飞机、火箭发动机、飞船燃烧室的零部件，耐高温炉零件，耐硝酸、硫酸和盐酸腐蚀的零部件等（执行标准：ASTMB365-98）。

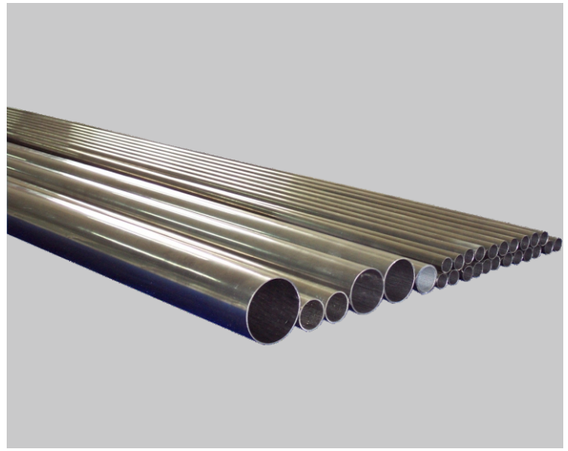
铌及铌合金由于其高熔点、耐腐蚀、冷加工性能好等特性，其棒、丝材、管材广泛应用于化学、电子、航空和航天等领域。铌及铌合金棒材被用作航空发动机的结构材料和火箭喷嘴、反应堆内部元件和包套材料、耐硝酸、硫酸和盐酸腐蚀条件下的各种耐腐蚀零部件。在铌中加入锆可明显提高材料的抗氧化性能和强度，铌及铌锆合金丝被大量用于制造高压钠灯及电解电容器阳极引线（执行标准：ASTMB392-95）。铌锆合金被制造成毛细管供应钠灯制造业（执行标准：ASTMB394-89）。

Tantalum and tantalum alloys (Ta-2.5W, Ta-10W, Ta-40Nb, etc.) have the characteristics of high melting point, corrosion resistance and good cold workability. So they are extensively applied to aviation and aerospace industry, high temperature technology, nuclear and chemical industry. Tantalum and tantalum alloys are mainly used for manufacturing components of supersonic aircrafts, rocket engines, spacecraft combustion chambers, high temperature furnace and corrosion-resistant components in nitric acid(HNO3),sulphuric acid (H2SO4) or hydrochloric/muriatic acid (HCL) environment. (Executive Standard: ASTMB365-98).

Niobium and niobium alloys are widely used in the fields of chemistry, electronics, aviation and aerospace due to their high melting point, corrosion resistance and good cold workability. Niobium and niobium alloy rods are used as structural materials and rocket nozzles of aviation engines, reactor internal components, sheath material and various corrosion-resistant components in nitric acid (HNO3), sulphuric acid (H2SO4) or hydrochloric/muriatic acid (HCL) environment. Adding zirconium to niobium can significantly improve the oxidation resistance and strength of the material. So Niobium and Nb-Zr alloy wires are used heavily in manufacturing of high-voltage sodium lamps and anode leads for electrolytic capacitors (Executive Standard: ASTMB392-95). Niobium-zirconium alloys are manufactured into capillaries. Supply of sodium lamp manufacturing industry (Executive Standard: ASTMB394-89).

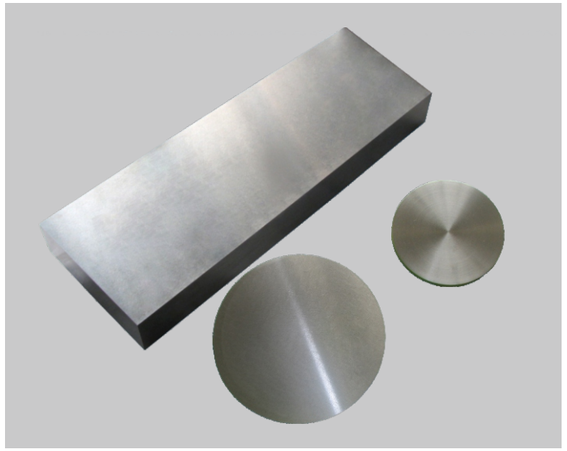
钽、铌具有高导电性、高热稳定性和对外来原子的阻挡作用，用溅射镀膜法在工件和集成电路表面镀上钽、铌镀层，可防止腐蚀和阻止铜向基体硅中扩散。与广泛使用的钛靶相比，钽、铌镀层具有更好的阻挡效果，钽、铌镀膜厚度可达0.005-0.01μm，在高级集成电路发展趋势所要求的多电路、多层金属化结构的应用中，钽，铌靶材在溅射膜层厚度和阻隔效果上具有不可比拟的优势。另外钽、铌靶材在热喷墨打印和液晶平板领域的应用也有广泛应用。

Tantalum and niobium have high electrical conductivity, high thermal stability and perfect barrier property to prevent other atoms infiltrating. Sputtering coating with tantalum and niobium on the surface of parts and integrated circuits can prevent corrosion and copper diffusing into the silicon substrate. Tantalum and niobium coatings have better barrier effect than titanium target materials which were widely used before. The thickness of tantalum and niobium coatings can reach 0.005-0.01 μm. In the multi-circuit and multilayer metallization structure application, tantalum and niobium targets have incomparable advantages in the thickness of the sputtering film and the barrier effect. In addition, tantalum and niobium targets are also widely used in the fields of thermal inkjet printing and LED panels.

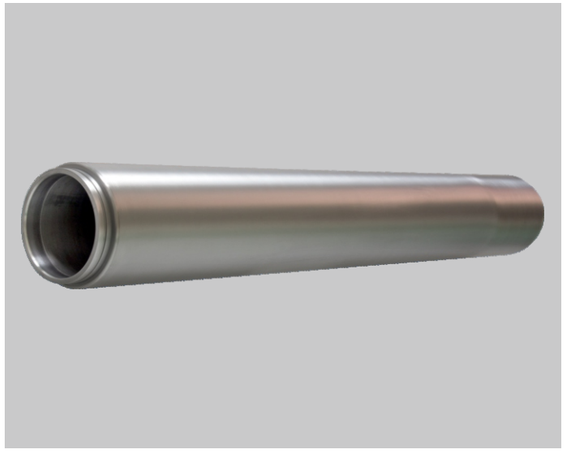


钽铌管材　Ta and Nb Tubes

铌锆丝材　Nb-1Zr Wire



钽铌靶材



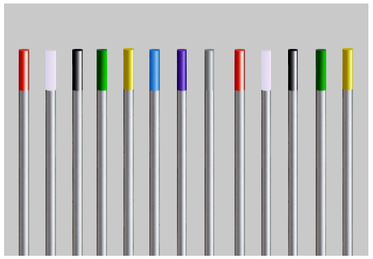
Ta and Nb Targets

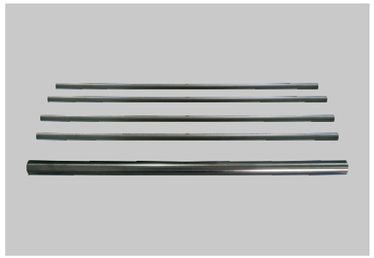
ATTL是中国钨电极行业的主要企业，是GB/T31908-2015《电弧焊和等离子焊接、切割用钨电极》国家标准的起草单位。ATTL从1993年开始一直致力于氩弧焊用钨电极的开发和生产，在生产、技术和管理方面积累了丰富的经验，其生产过程严格符合ISO9001:2015国际质量体系的要求，从而确保了ATTL钨电极的优良品质。

ATTL现在年产钍钨、铈钨、镧钨、钇钨、锆钨、纯钨和复合钨电极900吨，可为用户提供所有品种、所有牌号、所有规格的高品质钨电极。

ATTL is the main manufacturer of tungsten electrodes in China. It is also the drafter of National Standard GB/T 31908-2015 “Tunsten electrodes for arc welding and plasma welding and cutting”.It has been focusing its efforts on the development and production of tungsten electrodes for TIG welding since 1993. The abundant experiences in technology & production and the establishment of ISO9001:2015 quality control systems guarantee the excellent quality of the ATTL electrodes.

ATTL has an annual production capacity of 900 tons for all kinds of tungsten electrodes including Thoriated Tungsten, Ceriated Tungsten, Lanthanated Tungsten, Zirconiated Tungsten, Yttriated Tungsten , Pure Tungsten,Composite Tungsten electrodes . Any kind and any size of tungsten electrodes are available upon the demands from customers.





Product Standard 产品标准

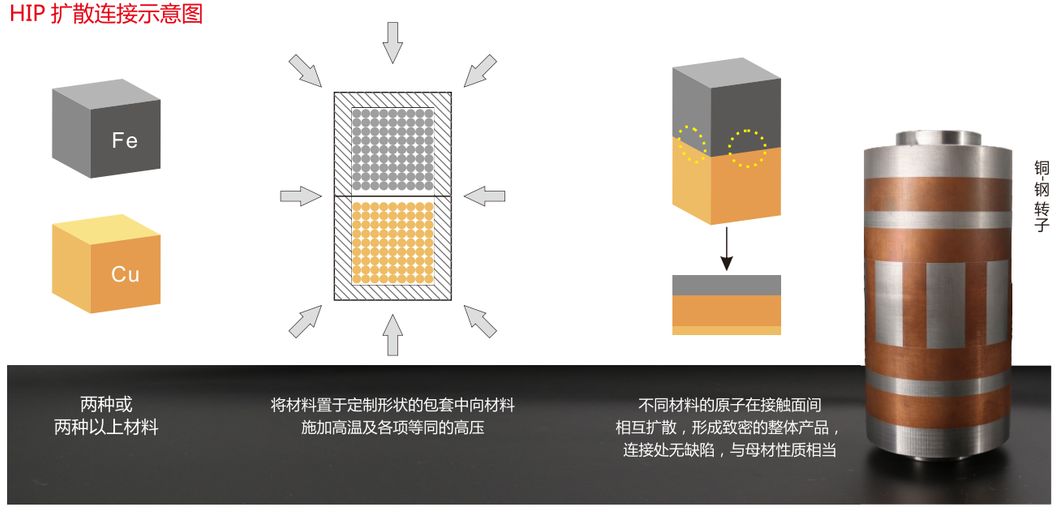
GB/T 31908-2015 ISO 6848 ANSI/AWS A5. 12/A5.12M-98

规 格	Size
直径：0.5-50mm	Diameter: 0.5-50mm
长度：150mm, 175mm, 178mm,	Length: 150mm, 175mm, 178mm,
客户要求的任意长度	Any other length at customer’s request.

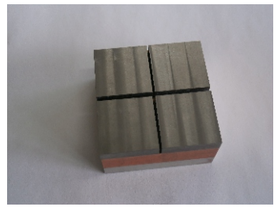
钢铁研究总院自20世纪60年代开始在国内最早开展研究、开发、制造热等静压(HIP)装备、进行HIP应用技术研究。针对粉末合金、陶瓷材料、高温合金、钛合金、铝合金、复合材料等材料体系在HIP粉末成型致密化、HIP铸件处理及HIP扩散连接方面形成了大量成果。安泰难熔秉承钢铁研究总院几十年的积累，具有国内最大的HIP装备能力和应用积累。

China Iron and Steel Research Institute (CISRI), the parent company of AT&M, is the earliest unit in China engaged in R&D of HIP technology and manufacturing of HIP equipment. AT&M made a lot of achievements in all of the HIP using fiebls (consolidating powders, upgrading castings, densifying presintered components, interfacial bonding) and the material research of HIP products (superalloy, high speed steel, Ti alloy, Al alloy, ceramic materials, composites etc.). Now, AT&M is the HIP R&D center and HIP equipment using center in China.

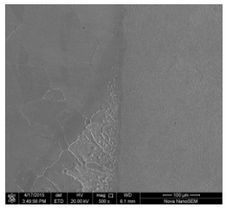
HIP 扩散连接示意图



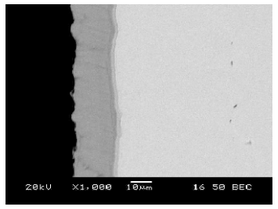
HIP 扩散连接技术应用



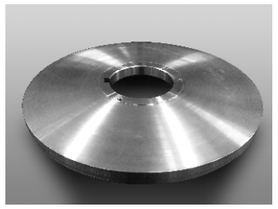
Be-Cu-SS HIP扩散连接后



微观形貌



微观形貌 Be-cu-SS



推力盘成品，尺寸927mm