

宁夏盾源聚芯半导体科技股份有限公司

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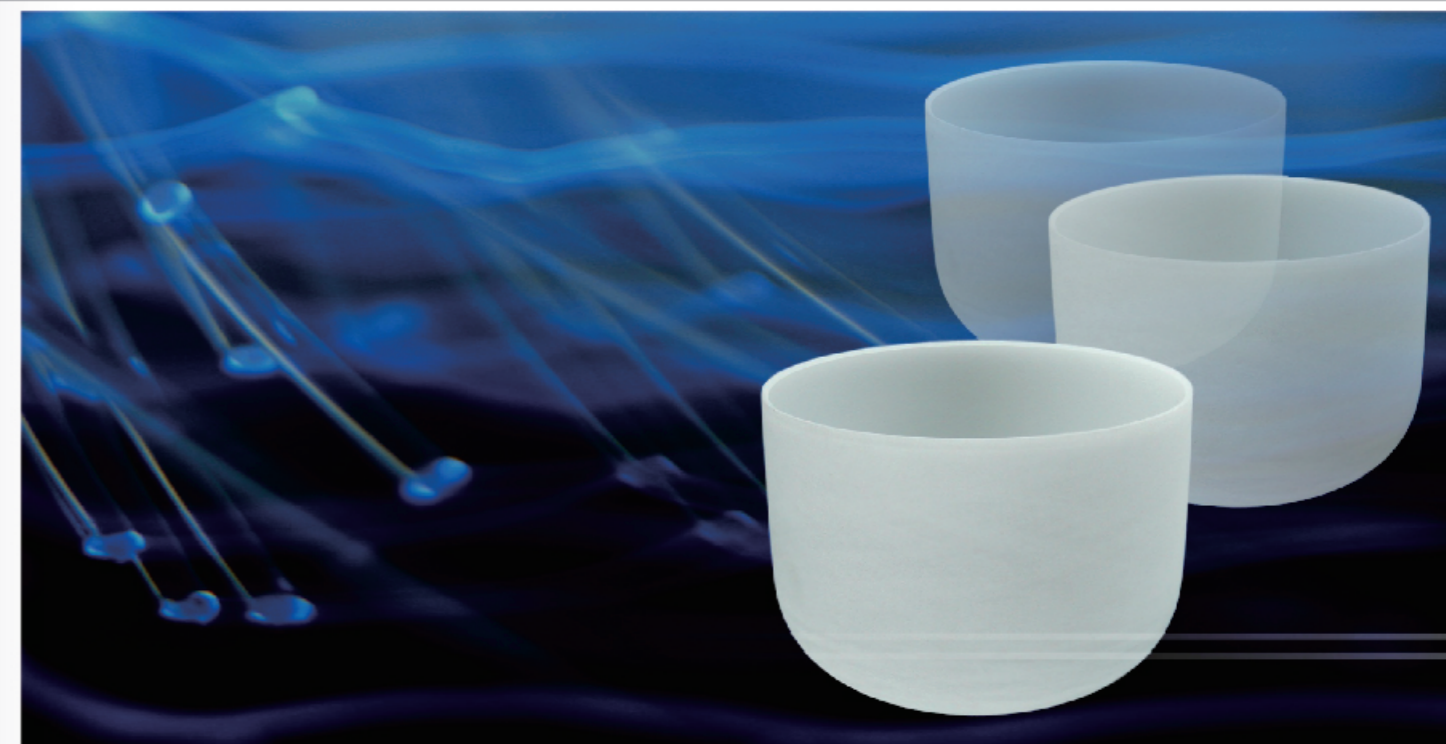
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Quartz Crucible

石英坩埚



www.sifusion.com.cn

宁夏盾源聚芯半导体科技股份有限公司
Ninxia Dunyuanjuxin Semiconductor Technology Co., Ltd.

COMPANY INTRODUCTION

公司介绍

宁夏盾源聚芯半导体科技股份有限公司（简称：FTNC）前身是宁夏富乐德石英材料有限公司，创建于2011年4月，于2011年9月正式投产。公司采用先进的工艺体系和生产管理，专业从事于半导体、大尺寸太阳能用高规格石英坩埚的研发和生产。

自成立以来，公司便一直是全球主流半导体硅片生产企业的主要坩埚供应商。公司不断优化产品结构，着力技术创新，对四大石英坩埚不断优化升级，从而满足国内外客户不断迭代的需求。产品规格无缝覆盖14英寸到32英寸，且具备根据客户需求开发定制更大尺寸的技术能力。公司顺应时代和市场发展，成功转型为以半导体坩埚为主的坩埚制造商，率先在国内开始大口径合成坩埚的研发和制造，并取得巨大成功。此外，公司还斥资对后加工进行洁净厂房及全自动产线升级，不断提升产品品质和稳定性。

Ninxia Dunyuanjuxin Semiconductor Technology Co., Ltd.(FTNC), formerly known as Ningxia Fuller Quartz Material Co., LTD., was founded in April 2011 and officially put into operation in September 2011. The company adopts advanced technology system and production management, specializing in semiconductor, large solar energy high specification quartz crucible research and development and production.

Since its inception, the company has been the main crucible supplier for the world's leading semiconductor wafer manufacturers. The company continues to optimize the product structure, focus on technical innovation, and constantly optimize and upgrade the four quartz crucible, so as to meet the needs of domestic and foreign customers constantly iteration. Product specifications range seamlessly from 14 "to 32" and have the technical capability to develop customized larger sizes according to customer requirements. In line with The Times and market development, the company has successfully transformed into a semiconductor crucible manufacturer, taking the lead in the development and manufacture of large diameter synthetic crucible in China, and achieved great success. In addition, the company also invested in post-processing clean workshop and automatic production line upgrade, constantly improve product quality and stability.

DEVELOPMENT PATH

公司历程 2010-2021

- 2010年12月 | 开始筹建
Dec.2010 start to establish
- 2011年04月 | 宁夏富乐德石英材料有限公司正式成立
April.2011 Ferrotec Ningxia Advanced Quartz Material Co., Ltd. was formally established
- 2011年09月 | 生产进入量产,产能达到 5000/月
Sep.2011.The production goes into mass production and the capacity can reach 5000/month.
- 2012年05月 | 扩大产能至10000/月
May.2012 Enlarge the capacity to 10000/month
- 2012年12月 | 公司通过ISO三体系认证
Oct.2012 passed the ISO and so on systems certification
- 2013年06月~2015年11月 | 陆续通过国内外客户的审核,生产顺利转移至银川工厂
Jun.2013-Nov.2015 passed the audit of domestic & international customers, the Production transferred to Yinchuan plant successfully.
- 2016年12月 | 后道工序全自动化项目开始启动
Dec.2016 The automatic program of the post processing was start.
- 2017年05月 | 新型坩埚AQM-42研发完成
May.2017 The R&D of new type AQM-42 was finished.
- 2017年09月 | 新型坩埚AQM-31研发完成
Sep.2017 The R&D of new type AQM-31 was finished.
- 2018年02月 | 大尺寸石英坩埚 32英寸研发完成
Feb.2018 The R&D of large 32 inch quartz crucible was finished.
- 2018年11月 | 后道工序全自动化设备就位,厂房改造完成
Nov.2018 The automatic equipment of the post processing was ready and the reform of the plant was finished.
- 2019年09月 | 半导体32'石英坩埚正式下线
Sep.2019 Semiconductor 32 'quartz crucible officially off the production line.
- 2020年06月 | 后道工序全自动化生产线正式投入使用
Jun.2020 After the full automatic production line formally put into use.
- 2021年07月 | 由宁夏富乐德石英材料有限公司重组股改,更名为宁夏盾源聚芯半导体科技股份有限公司
July.2021 Ferrotec Ningxia Advanced Quartz Material Co., Ltd.was restructured and renamed Ninxia Dunyuanjuxin Semiconductor Technology Co., Ltd.

AUTOMATED PRODUCTION EQUIPMENT

自动化生产设备



PRODUCT SERIES

产品系列

AQM-10 | 内壁涂透明层的天然石英坩埚。适用于：太阳能单晶硅的拉制。
Natural quartz crucible with transparent layer in the inner wall. Apply to: the crystal pulling of the solar energy single silica.

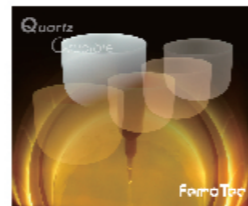
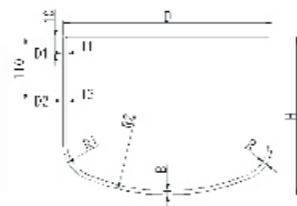
AQM-20 | 高纯天然石英坩埚，在AQM-10的基础之上增加高纯天然砂，内表面纯度较高。适用于：半导体和太阳能单晶硅的拉制，主推型号：AQM-21。
High purity natural quartz crucible, increase high purity natural sand on the basis of AQM-10, with high purity in the inner surface. Apply to: the crystal pulling of the semi-conductor & solar energy. Main type: AQM-21

AQM-30 | 合成石英坩埚，内表面纯度更高，适用于高级别硅棒的拉制。适用于：半导体单晶硅的拉制，主推型号：AQM-31。
Synthetic crucible with higher purity in the inner surface, apply to crystal pulling for the high level silicon rod; Apply to: crystal pulling of the semi-conductor single silicon. Main type: AQM-31

AQM-40 | 内表面结晶化的天然石英坩埚，适应多次加料工艺，长时间使用。适用于：太阳能和半导体单晶硅的拉制，主推型号：AQM-42。
Natural quartz crucible with inner surface crystallization, adapt to multiple charging process and long time using. Apply to: crystal pulling of the solar energy & semi-conductor. Main type: AQM-42

产品尺寸规格

DIMENSION & SPECIFICATION OF THE PRODUCTS



单位(Unit):mm

项目/Item		16"	18"	20"	22"	24"	26"	28"	32"
外径 Outer diameter (mm)	D1	404±2	457±3	507±3	556±3	611±3	656±3	705±3	810±3
	D2	404±2	457±3	507±3	556±3	611±3	656±3	705±3	810±3
厚度 Thickness (mm)	T1, T2	8.5±2	9±2	10(-2/+3)	11(-2/+3)	11(-2/+3)	12(-2/+3)	13(-2/+3)	16±4
	TR	8.5±2	10±2	11(-2/+3)	12(-2/+3)	12(-2/+3)	12(-2/+3)	13(-2/+3)	23±5
	TB	8.5±2	10±2	11(-2/+3)	12(-2/+3)	12(-2/+3)	12(-2/+3)	13(-2/+3)	16±4
真空透明层 Vacuum transparent layer (mm)	W	≥2.5	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0
	R	≥2.5	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0
	B	≥2.5	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0	≥3.0
R形状 R shape	R1	90	120	90	110	120	120	120	160
	R2	406	500	508	558	610	660	711	810

备注:以上为我司标准尺寸,实际尺寸规格可按照客户要求定制。

Remark: Above are AQMN's standard dimensions, the actual dimension spec can be Customized by the customers' requirement.

PRODUCT FEATURE

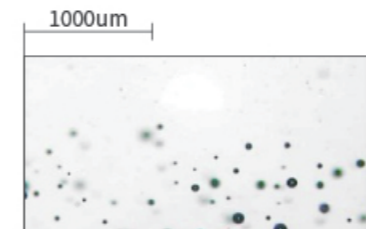
产品特点

高DF率

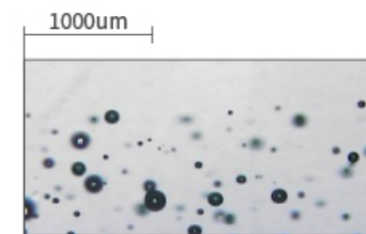
石英坩埚是单晶硅的拉制过程当中必不可少的部件,它的性能对单晶硅的成晶率有较大影响。这是因为当坩埚的内表面产生失透时,石英结晶体就有可能脱落,继而粘附在单晶硅上从而降低成晶率。我司生产的石英坩埚不易失透并具备以下两个特点:

- 1) 透明层中少气泡化
- 2) 内表面高纯化

本公司生产的石英坩埚,透明层中基本无气泡。且当前的主推型号(AQM-21, AQM-31, AQM-42)采用了特殊的加工技术,使得该系列产品在使用过程当中,可以抑制不透明层中的气泡膨胀,大幅提升石英坩埚在高温下的使用寿命。以下是此种工艺生产的坩埚使用前后的切面情况。



使用前石英坩埚的切面图
Cross section before use



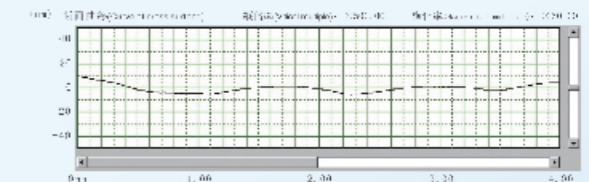
使用后石英坩埚的切面图
Cross section after use

High DF rate

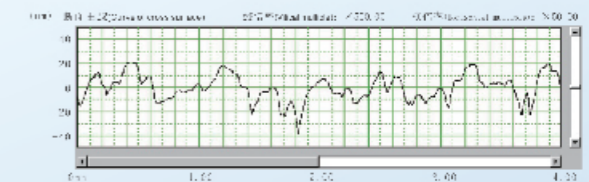
Quartz crucible is an essential component in the process of the mono-crystal silicon pulling whose performance has great influence on the crystallization rate. This is because when devitrification occurred on the inner surface, the crystallography may fall off then adhere to the single silicon, thus to reduce the crystallization rate. AQMN's crucibles aren't easily to form devitrification and have the following 2 characteristics:

1. Less bubble in the transparent layer
2. Inner surface high purification

Quartz crucibles produced by our company, there are no bubbles in the transparent layer. The current main type (AQM-21, AQM-31, AQM-42) all adopt special process technology, then make the series can restrain bubble expansion in the back-up layer and promote the service life under high temperature drastically. The following is the cross section of the crucibles produced by this technology before and after use.



使用后AQM-40内表面粗糙度数据



使用后AQM-10内表面粗糙度数据

为了达到内表面高纯化,我们从原材料以及生产控制两个方面进行管控。原材料方面,我们精选国际知名石英砂厂家,以确保原料纯度。生产控制方面,各工序严控金属元素污染,并通过各种精密分析仪器对金属元素等污染进行定期分析监控。

此外,我们还研发出独特的涂层工艺,目的是在坩埚表面形成一层致密的结晶层,降低石英坩埚与硅液的反应程度,防止石英结晶体脱落进入硅液影响单晶硅的成晶。AQM-40系列即采用此种工艺。

以下是我司对有涂层系列坩埚(AQM-40)使用后的内表面粗糙度和无涂层系列坩埚(AQM-10)进行分析,涂层坩埚使用后的内表面粗糙度在不同深度里更均匀,即体现了涂层所起到的降低反应程度的作用。

In order to achieve inner surface high purification, AQMN make control from Raw material & production control. As for the raw material, we choose international well-known quartz sand manufacturers to ensure the purity. As for the production control, metal elements are strictly controlled in all process, regular analysis & monitoring for metal elements etc. other contamination are done by variety precision analytical instruments.

Moreover, we also develop special coating technology to form a compact crystallizing layer on the inner surface of the crucible, to decrease the reaction of quartz crucible & silicon liquid, to prevent crystallography falling off into the silicon liquid, then influence the crystallization of single silicon. AQM-40 series are using this technology.

The following are the analysis of interior surface roughness of coating series (AQM-40) & uncoated series (AQM-10) after using, the interior surface roughness of coating crucibles after using is more symmetrical in different depth, that reflects the effect of coating on reducing the reaction level.