

XRT

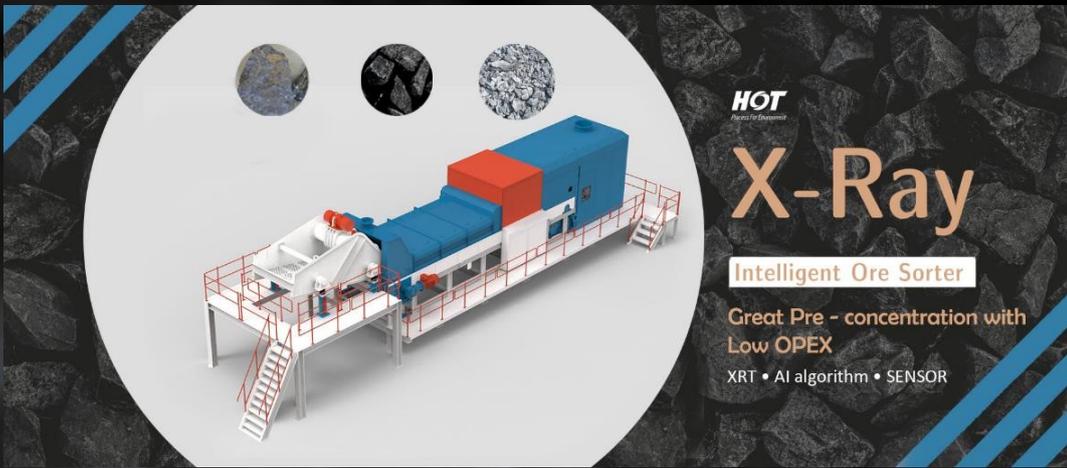
智能光电 矿石分选机

XRT Intelligent
Sensor-based Ore Sorter

北京浩沃特工业技术有限公司 Beijing HOT Mining Tech Co., Ltd



碳中和
SorterX



X-Ray

Intelligent Ore Sorter

Great Pre - concentration with Low OPEX

XRT • AI algorithm • SENSOR

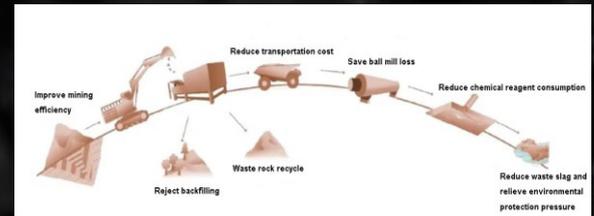
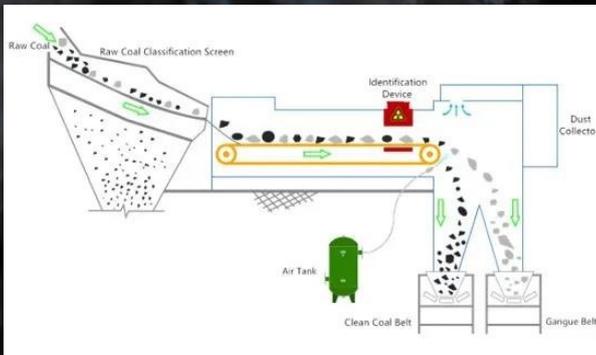


什么是XRT智能分选 What's XRT

XRT分选机的工作原理：

基于X射线和传感器技术，XRT智能分选机将原煤排队后，使用X射线对原矿进行扫描，由探测器采集数据，采用传感器和大数据分析，通过智能算法识别区分矿石与废石，并用气排枪喷出废石，实现高效自动智能分选。

Based on the X-ray and sensor technology, XRT intelligent sorter scans the raw ore with X-rays and collects data from the detector. With the help of Big data analysis and intelligent algorithms, the ore and waste rock was identified and the high-pressure blower sprays waste stone away to realize efficient automatic intelligent sorting.



Why XRT 为什么要用XRT

通过XRT智能分选技术可提高矿山入选矿石的品位，抛弃大量废石并对尾矿、矿渣中的有价值矿物实现回收再利用，从而降低下游（破碎、研磨、浮选等）工序的处理费用，大幅提升矿山效率和经济效益，延长矿山寿命。可广泛应用于各类矿山，包括贵金属，有色和其他矿物，如煤、金、银、钼、铜、锌、钨、钒等。

Through the intelligent sorting technology, the grade of selected ore can be improved, a large amount of waste rock can be discarded, and valuable minerals in tailings and slag can be recovered and reused, so as to reduce the processing cost of downstream processes (crushing, grinding, flotation, etc.), It can be widely applied in all kinds of mines, such as coal, gold, silver, molybdenum, copper, zinc, tungsten, vanadium and so on.

矿物预选 ★ 节能降耗

Ore Pre – concentration, Energy Saving, Carbon Emissions Reduction



SorterX is an efficient intelligent ore pre-concentration equipment (water-free process) that combines X-ray transmission(XRT), image recognition and AI algorithm technology.

SorterX 是结合X射线传输技术（XRT）、图像识别以及AI算法的高效智能矿石预富集设备（干选）。

SorterX



SorterX is widely used in the separation of metal/nonmetallic ores, industrial ores, energy (coal preparation) minerals, slag, diamond and etc.

SorterX 分选机广泛用于分选金属/非金属矿石、工业矿石、能源（煤炭分选）、矿渣、金刚石（钻石）等。

设备优势 Advantages



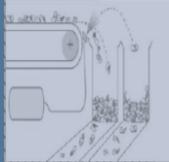

XRT高精度传感
XRT high-precision sensing

系统自主研发探测器
高分辨率成像
High resolution imaging




实时智能物质识别
Real-time & smart substance identification

AI智能算法软件
多维度建模、快速识别
AI Fast identification

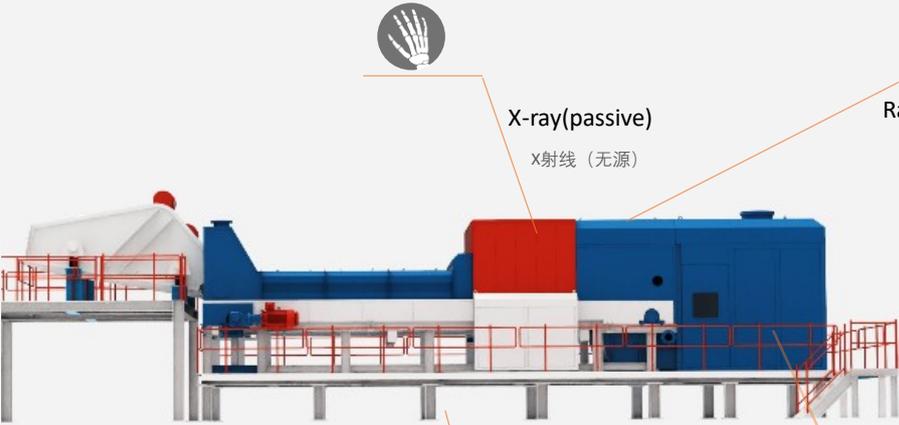



全自动高速喷吹分选
Automatic high-speed pneumatic injection

精确喷吹控制
亚毫秒级响应时间
Accurate control and reaction

在煤炭领域，XRT智能分选机对炼焦煤、动力煤均有较强的适应性，对原煤的灰分适应性也较好。当灰分低，矸石量少时“打矸”，当灰分高，矸石量大时，可反选“打煤”。喷吹方向灵活多变，解决了从下往上喷的技术难题，且上喷设备已投入应用，可多角度喷选；预判轨迹，精准喷吹。

XRT sorter has strong adaptability to both coking coal and thermal coal, as well as to ash content of raw coal. It can flexibly choose to separate coal or gangue, depending on the ash content and gangue amount. Pneumatic injection direction is flexible, either from lower part to higher part, or from higher part to lower part. The material track can also be predicted and injected precisely.



X-ray(passive)
X射线 (无源)

Rapid Recognition
快速识别

AI Algorithm
AI算法

Precise Control
精确控制



| 内容 Content | 小功率 Miniwatt | 大功率 Superpower | 说明 Explanation |
|------------------------------------|--------------------|------------------------|---|
| 部件架构 Component Structure | 一体式 Integrative | 分体式 Separated | 分体式结构复杂，故障率高 The separated structure is complex and has higher failure rate |
| 射线防护 Radiation Protection | 容易 Easy | 难 Hard | 大功率射线源需要多出数吨铅皮做防护 High power radiation source requires tons of extra lead housing for protection |
| 使用寿命 Lifespan | 较长 Long | 较短 Short | 大功率球管整体损耗较大 The overall loss of the high-power bulb tube is high |
| 维护成本 Maintenance Cost | 较低 Low | 较高 High | 分体式高压和冷却部分需要额外定期维护 The separated high pressure and cooling section require additional regular maintenance |
| 维修成本 Repair Cost | 较低 Low | 较高 High | |
| 更换成本 Replace Cost | 较低 Low | 较高 High | 球管为损耗件且保修期相对较短，大功率价格昂贵，出保后更换费用高 The bulb tube is wearing part with short warranty. High power means high replacement cost after the expiry of warranty |
| 射线泄露风险 Radiation Leakage Risk | 较低 Low | 较高 High | 防护难，泄露风险大 Hard to protect with high possibility of leaking |
| 监管部门 Administrative Supervision | 县级 County Level | 省级 Provincial Level | 功率越高，监管越严格 The higher the power, the stricter the supervision |

假设操作员8小时*300天紧贴设备，年累计辐射剂量仅0.5mSv

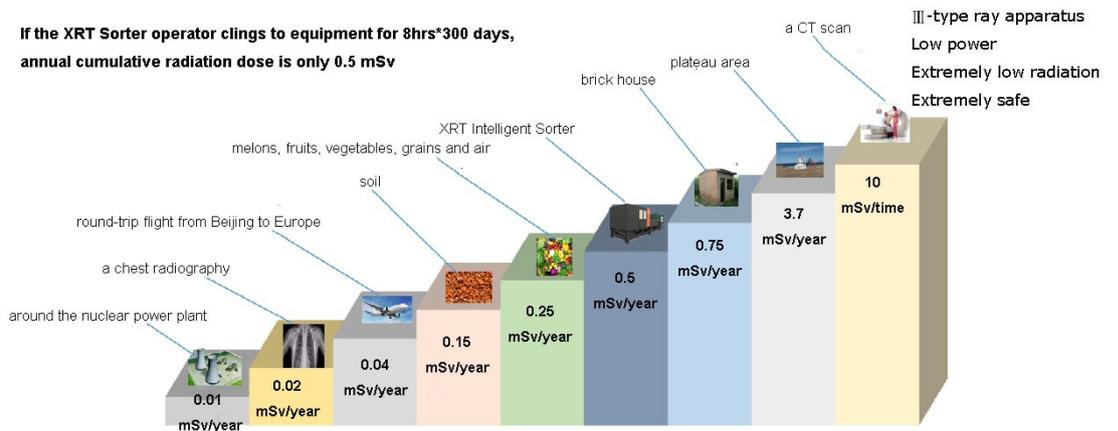
XRT智能光电干选机采用 III类射线装置，一体式射线源，低功率，更安全



分体式射线源



一体式射线源



设备参数 Technical Parameter

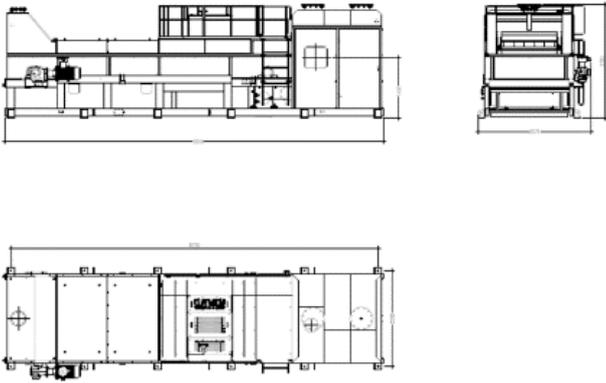


| 项目 Item | 内容 Content | 备注 Remark |
|------------------------------|---|--|
| 原矿 Raw coal | 适用于原煤破碎初选。适用于钨、锡、锑、铅锌、铜、金、银、钼等金属矿及萤石、磷、硫化铁等非金属矿。 Applicable for raw coal crushing and preliminary sorting; Applicable for tungsten, tin, antimony, lead and zinc, copper, gold, silver, molybdenum and other metallic minerals and fluorite, phosphorus, sulfide and other non-metallic minerals. | |
| 分选原理 Separation principle | XRT | X射线衍射形貌术 X-ray Diffraction Topography |
| 粒度范围 Size fraction | 可以根据不同的要求选择多种范围，包括：+8-40mm，+12-60mm，+20-100mm，+50-300mm。 Size range varies according to different requirement, including: +8~40mm, +12~60mm, +20~100mm, +50~300mm. | |
| 产量 Output | 40-380吨/小时，由入料原矿及皮带宽度等因素决定。 40-380t/h, depends on feed raw coal characters, belt width, belt speed, feed size and other factors. | |
| 主机尺寸 Dimension | 9*2.3*2.5 (m) | |
| 重量 Weight | 10 (t) | |
| 功率 Power | < 10KW | |



XRT智能光电矿石分选机是高效环保的智能矿石分选设备。经矿山实际测算，抛废率可高达88%，针对原矿抛废率可达30~60%，金属回收率最高可达99%。金属有效分选粒级范围+8-100mm，煤矿有效分选粒级范围+10-300mm，单机处理量最高可达40~380t/h，是目前国内唯一在有色金属、黑色金属、非金属和煤矿均有实际应用的智能矿石分选机。

XRT sorter is a highly efficient and environmentally friendly intelligent ore sorting equipment, it has been practically applied in the field of coal gangue pre-discarding, non-ferrous metal and ferrous metal pre-concentration. According to the actual calculation, the waste disposal rate can reach as high as 88%, the waste disposal rate for the raw ores can reach up to 30 - 60%, and the metal recovery rate can reach up to 99%. Capacity of single unit of XRT sorter is 40 - 380tph.



XRT智能干选系统组成

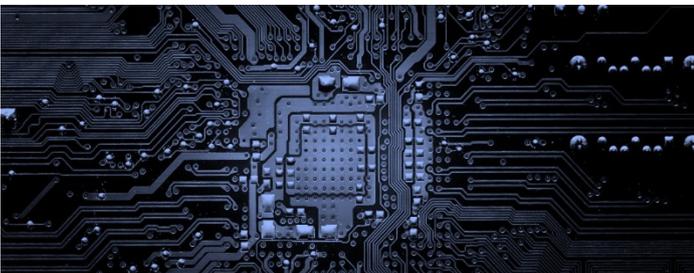
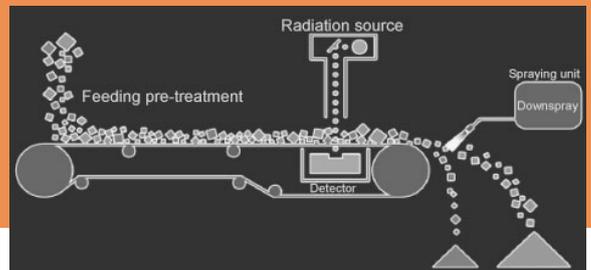
智能矿石分选机主要部件，按照各部分的结构实现功能，可分为以下4个部分：

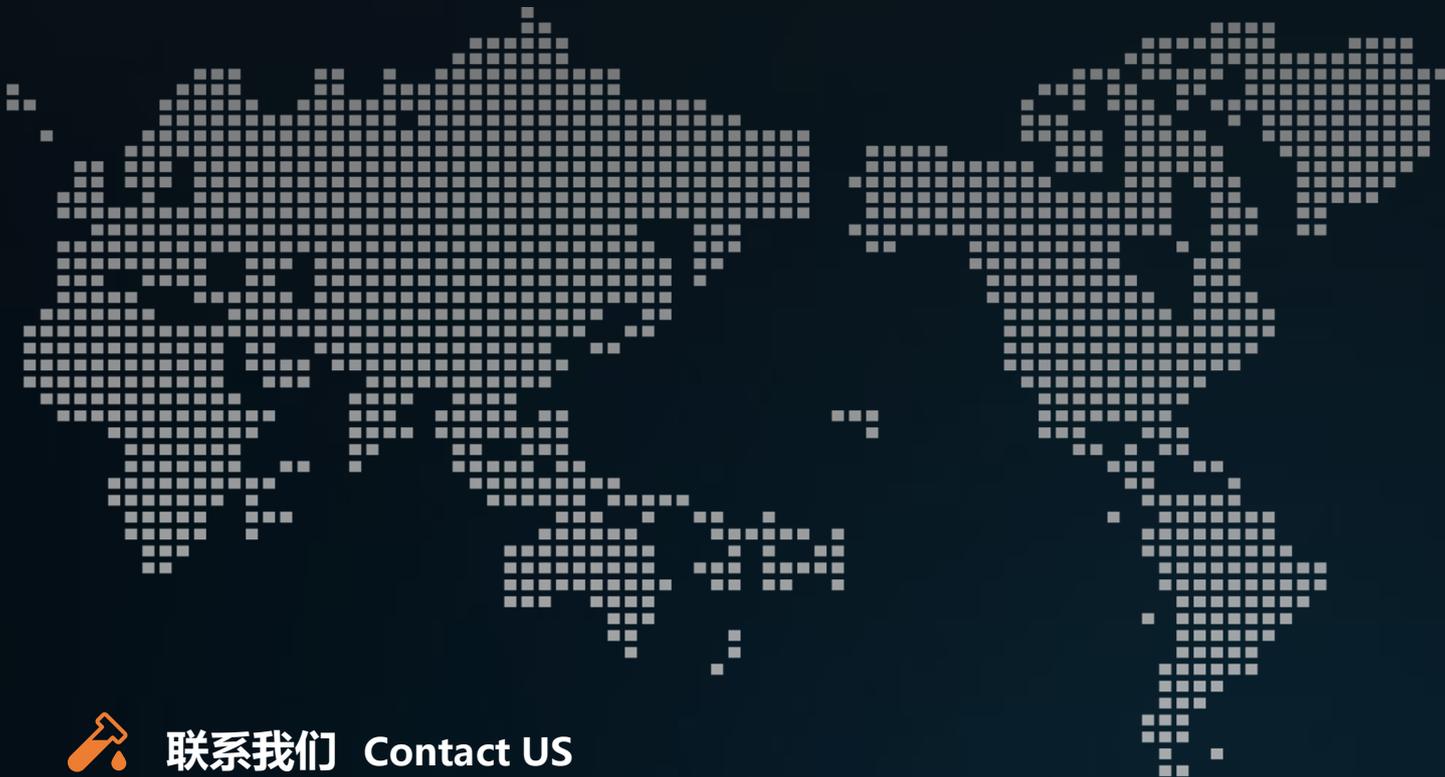
- 给料系统：输送矿石，让矿石间隔、稳定地进入检测区域。
- 检测系统：是矿石分选设备的核心部分
- 信号处理系统：对检测系统获取的特征信息进行高速处理，利用人工智能算法对矿石图像和数据进行分析和识别，并决定是否喷除废石。
- 分离执行系统：利用高压气排枪作为动力，可将目标矿石喷离原有路线，实现分选目的。

XRT Intelligent Sorting System

- The main components of the intelligent ore separation machine, according to the structure of each part, can be divided into the following 4 parts: Feeding, Detection, Signal Processing and Sorting and Execution System.

- 高压气排枪具有反应迅速，控制灵敏的优点，相比传统的机械打板，新型的机械手等方式，具有显著的产量优势。
- 喷吹系统独有二个1立方米的风包设计，更安全可靠，安监环保检测合格。
- 设备自带有矿石、废石计量功能，可代替矿石计量器，并能详细分粒级统计。
- 喷吹阀距合理，避免了同类产品喷阀间距宽，导致的喷吹操作时易出现连带喷吹或吹不到，精矿、废石一起被吹出，造成废石品位偏高的问题。
- 采取更安全的III类射线装置实际使用功率160W，仅为同类产品（3000W）的十五分之一。辐射安全无需担心。
- The high pressure air blower has the advantages of quick response and sensitive control.
- The injection system has two unique 1 m³ air bags.
- The power of the ray source device of the intelligent ore separation machine is 200W, and the actual power is 160W, which is only one fifteenth of the similar products (3000W).





联系我们 Contact US

欢迎来样试验 Welcome to send us samples for test!

网址/Web Site



www.hotmining.cn



www.hotminingepc.com



www.hotmining.ru

办公室/Office



北京：北京市东城区银河SOHO A座8层10811室
Beijing: Room10811, Floor8, Building A, Galaxy SOHO, Dongcheng Dist, Beijing, China
电话/Tel: +86 10-5957 6240
Email: sales@hot-mining.com



投资&媒体 Investment & Media
Room 1702, Block C, Science and Technology Building, Tsinghua Science and Technology Park, Haidian District, Beijing
Email: mango.chen@hot-mining.com



成都：四川省成都市高新区益州大道北段777号中航国际交流中心A座11层
Chengdu: Room 1104, Building A, AVIC International Plaza, No. 777 Yizhou Avenue, High-Tech Zone, Chengdu, Sichuan Province, China
电话/Tel: +86 28 8331 1885
Email: sales@hot-mining.com



西班牙
Spain: Misericordia 4, Cerdanyola del Valles, Barcelona
Email: lantis.ye@hot-mining.com



俄罗斯
Russia representative: EMBER MINERALS LLC
Россия: Кемеровская область - Кузбасс, г. Новокузнецк, проспект Н.С.Ермакова (Центральный Р-Н), д. 9А офис 215,
Tel: + 7-960-927-2277
Email: russia@hot-mining.com



西藏：拉萨市当热路天路康德2栋2单元501
Tibet: Room 501, unit 2, building 2, Tianlukangde Community, Dangre East Road, Lhasa
电话/Tel: +86 19940581207



赞比亚：
Zambia: Plot 6689 Olympia Extension, Chiwalamabwe Road. Lusaka Zambia
Email: 37798587@qq.com (Mr. Yuhang Shao)



印度尼西亚
Indonesia: Kelurahan Kebon Kelapa, Kecamatan Gambir, Jakarta , Jakarta 10120
Representative: PT. BINA DAYA LAHAN PERTIWI (BDLP)
电话/Tel: +62 81219220885
Email: sales@hot-mining.com



制造基地：
山东济宁市高新技术开发区联华路8号信息产业园二号楼
Autonomous & IIoT Manufacturing Base: Building 2, IT industry park, No.8 Lianhua Road, High-tech Development Zone, Jining City, Shandong Province



德江：贵州省铜仁市德江县青龙街道惠田二期
Dejiang: Qinglong Street, Dejiang County, Tongren City, Guizhou Province, China
电话/Tel: +86 15884591463



贵州省独家代理
地址：盘州市干沟桥翰林苑59-5-201
电话：135 9582 3930 (杜先生)



山东
芯未来智能装备(山东)有限公司
地址：山东济宁市高新技术开发区联华路8号信息产业园2号楼
电话：19862709366 (张先生)



陕西省独家代理
地址：陕西省西安市雁塔区朱雀南路1589号南飞鸿广场3幢11139室
电话：15202951325
邮箱：andy.cheng@alpha1888.com (程先生)



海南
芯未来智控技术研究院(海南)有限公司
地址：海南省海口市嘉积镇东风路238号
电话：151 5472 1118 (王先生)