

IES OptoSort®

„Improvement of optical sorting of mineral bulkgoods“

Industrial Engineering and Solutions GmbH & Co. KG

- **Branch OptoSort** -

Feldscheide 1

D – 25560 Schenefeld

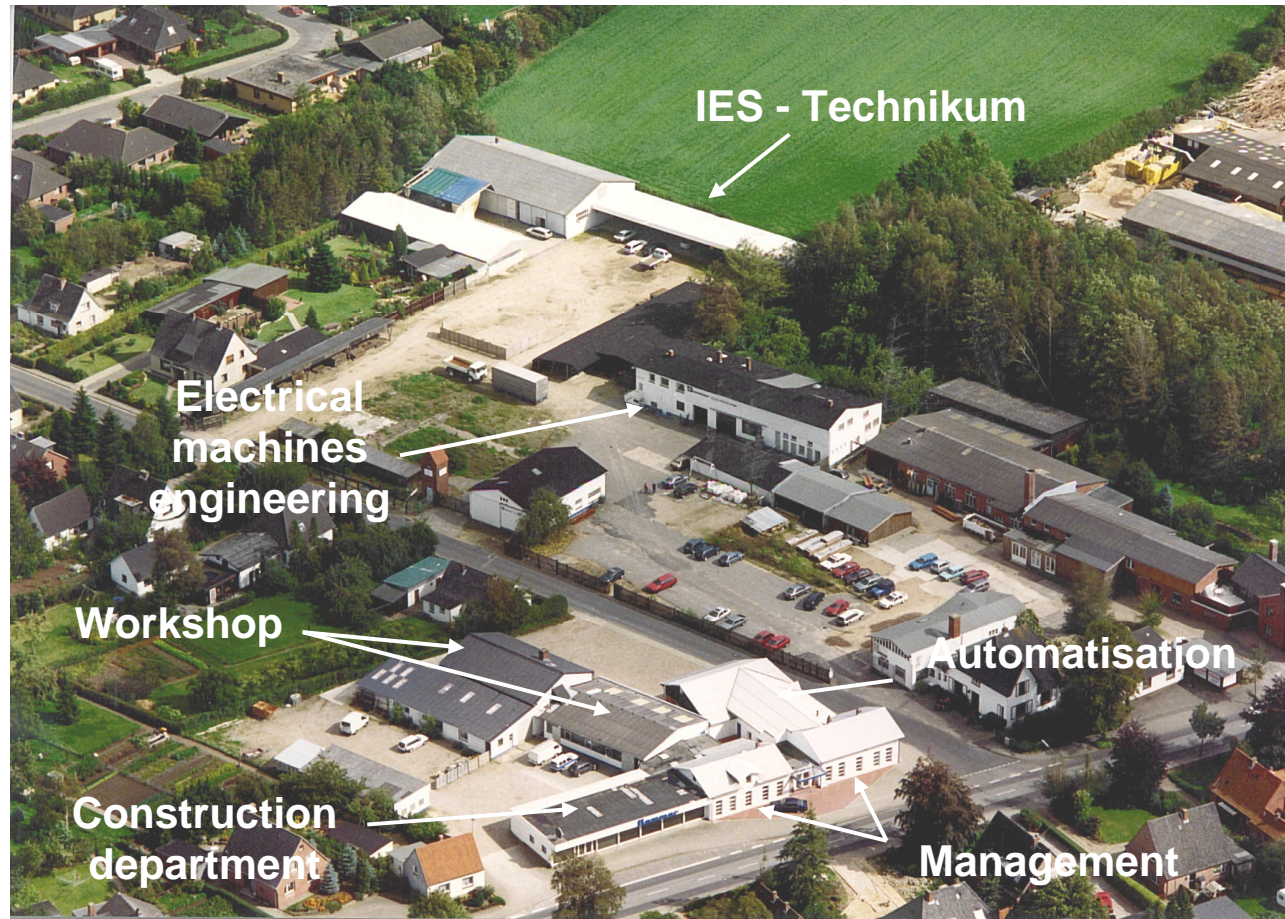
Tel.: +49 (0)4892 8007-0

Fax: +49 (0)4892 8123

<mail to: info@optosort.de>

Web: www.ies-optosort.com





Located in D – 25560 Schenefeld / Itzehoe

OptoSort® Sorters



Belt Compact 1200

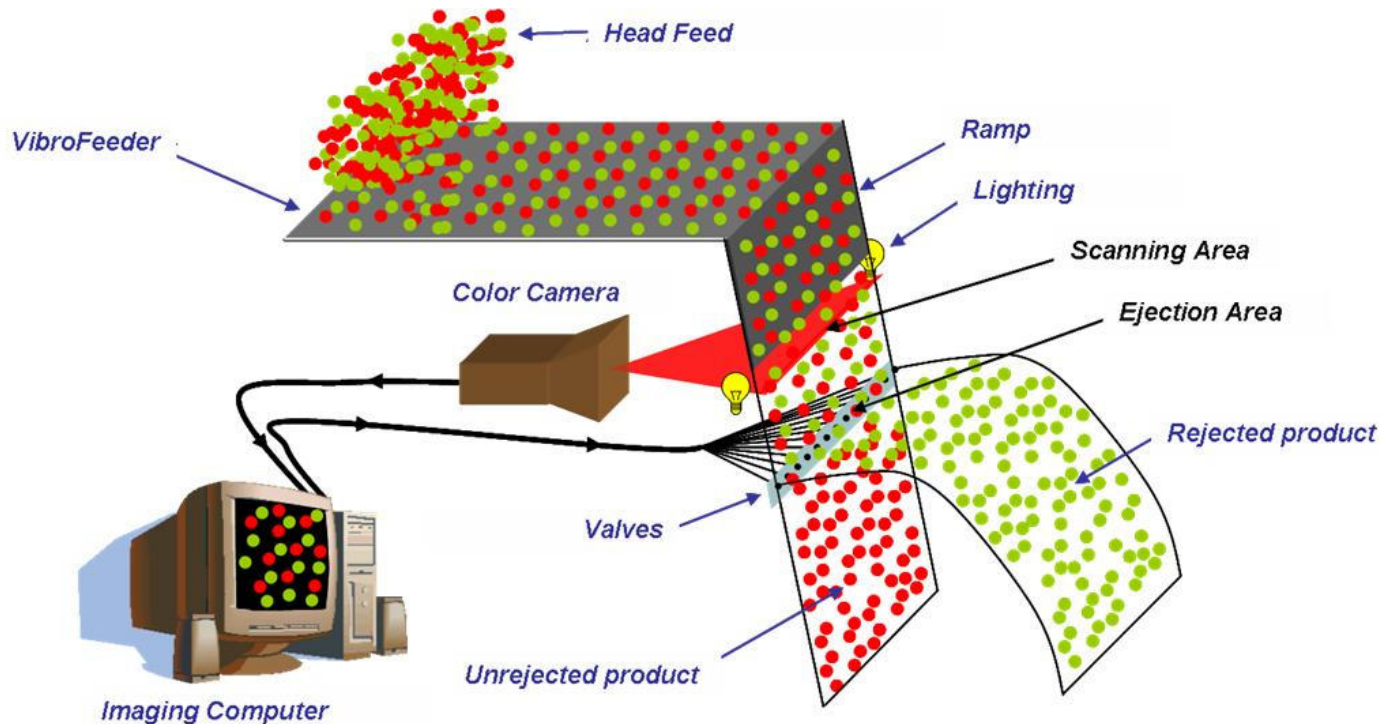


Gravity 1200 P200



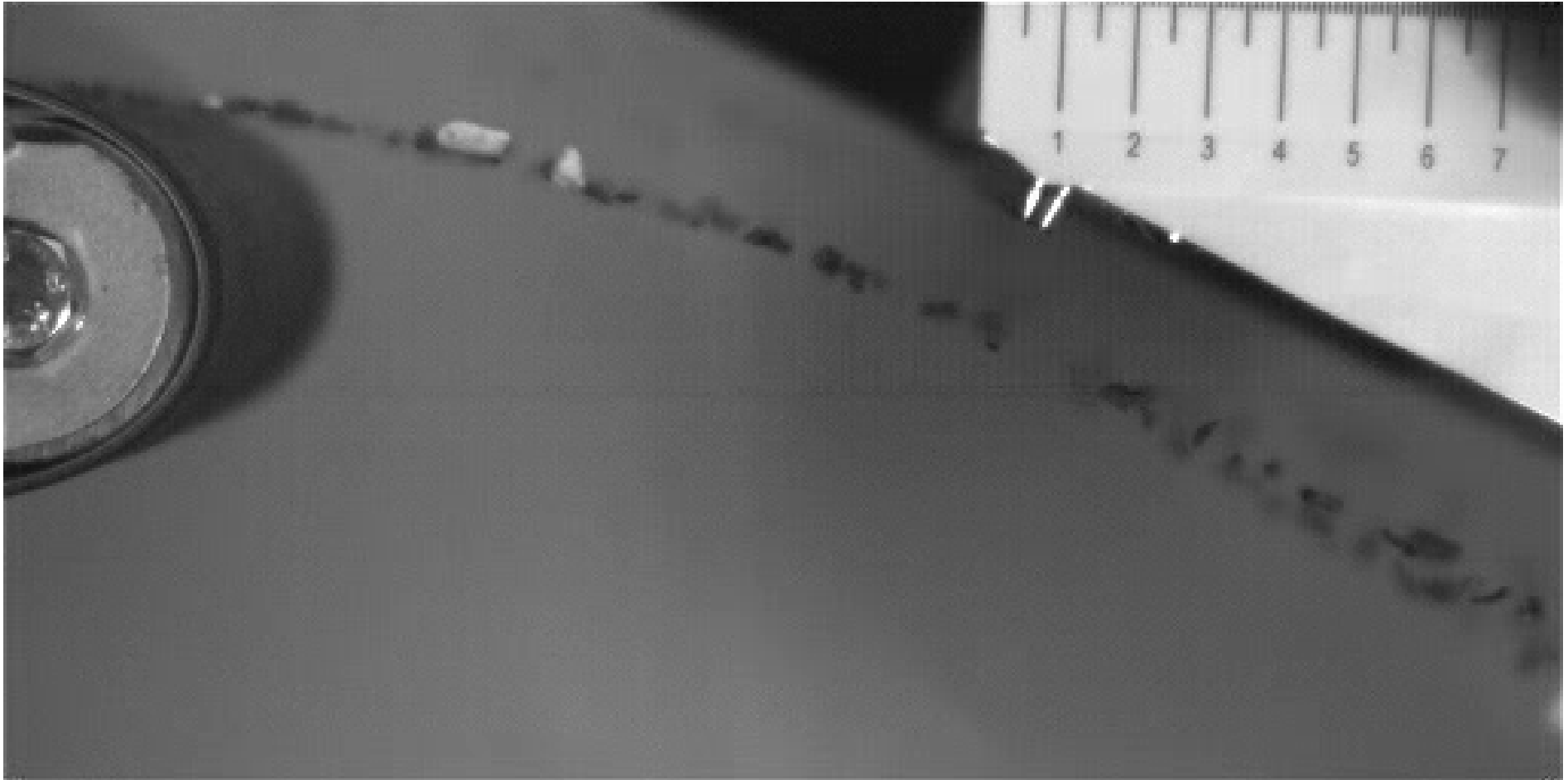
GemStar 600

Sorting Process



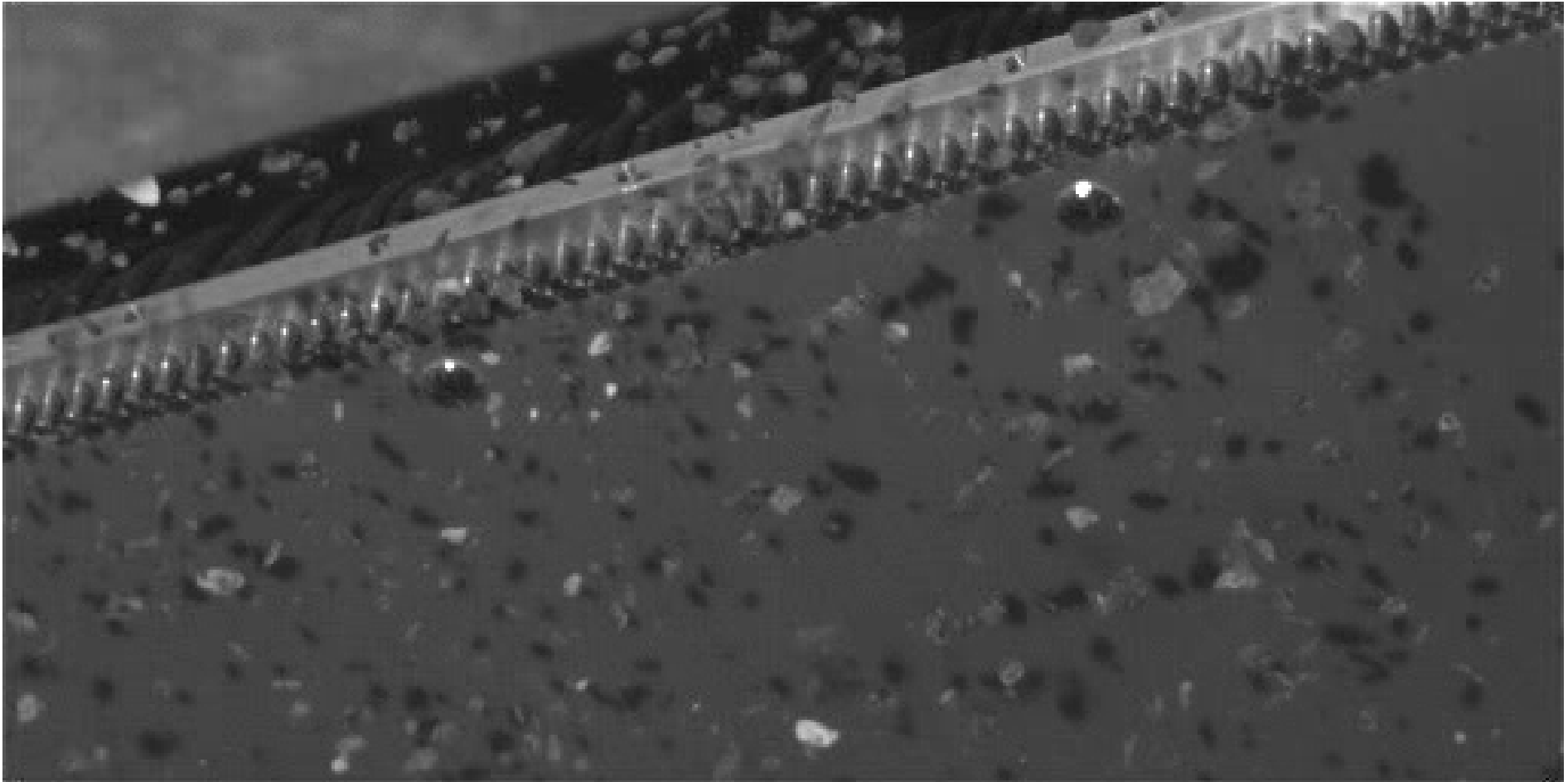
Camera pixel frequency :	20 MHz
Scanning rate :	10 000 lines/second
Objects scanned :	up to 30 000 objects/second
Number of ejectors :	up to 384

Ejection process - side view



Grain size 4-10 mm at 3 m/s

Ejection process – underside view



High Throughput Grain size 4-10 mm at 3 m/s

Advantages of optical sorting

- **Increase :**
 - Productivity
 - Throughput
 - Quality of product
- **Decrease :**
 - Loss of good product
 - Maintenance time and costs
 - Operational costs
 - Transportation costs
- **Environment friendly:-**
 - Low water consumption
 - Low energy consumption
 - No X-ray safety hazard
 - No need of chemicals

Advantages of OptoSort®

- Standard Hardware & Software platform with Windows 2000/XP ®
- Remote control of the Sorters via DSL or ISDN for a high reactivity
- High Speed ejector system (reaction time less 1.5 ms)
- Fast camera systems for a high throughput (doubleside inspection possible)
- Morphology operations for improved image handling
- Sorting of complex colored materials is possible due seven independent teachable color classes and logical linkage
- Additional features as geometry (length and width), area and shape classification
- Free combination of all operations for a very accurate sorting
- Build in teaching let you create your own sorting programs

Operation Modes and Interfaces

➤ The machines can be operated :

- Local (*build-in screen and keyboard*)
- In a server – client architecture (based on CCSort® software)

➤ Features of CCSort® :

- Up to 12 sorters controlled via one network server
- Integrated communication functionality via profibus
- Complete recipe database for all sorters
- Online display of throughput and ejection rates
- Alarm monitoring database (control of machine status)

Sorting Applications

Gold



Diamonds



Nickel



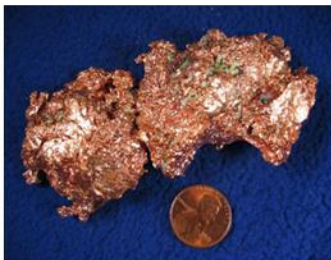
Talcum



Calcite/Dolomite



Copper



Salt



Limestone



Size control



Quartz

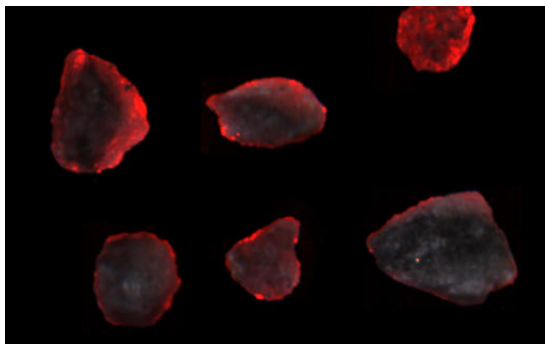
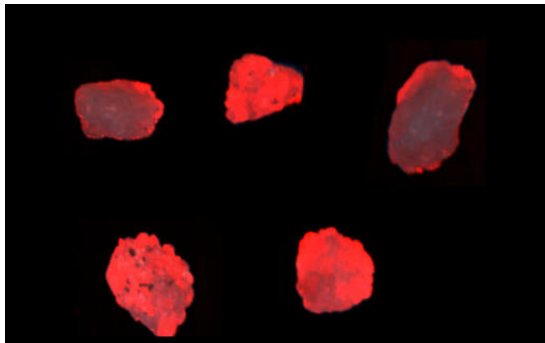


Light source arrangements for improved detection

- **Top light illumination**
 - Light sources using the physical properties of the light
 - Light sources with non visible wavelengths
- **Back light illumination**
 - Light source arrangement using the physical properties of the material
- **Combination of both**
 - Light source arrangement using the reflection and transmission properties of the material

Example: Rock Salt

- Recognize and separate salt safely from contaminants
- Also finds contaminations enclosed in the salt



Fraction	Gravity 1200 P200
+10 - 25mm	25t/h
+25 - 60mm	60t/h
+60 -150mm	140t/h



Sorting Demonstration: rock salt

Bulk Material Inspector - _2006-02-28_BasicProduct

File Edit View Tools Help

Production

Stop Sort

Sensitivity

Select

Adaptation

Set up

New

Modify

Service

Permission

Settings

Diagnosis

Parameter

Sort Parameter

Shape Geometry Touch Special Parameter

Amplifier Filter Colour Areas Total Areas

amplification factors for the colour distributions

	current:	new:
- good [" 0.01]:	100	100
- bad [" 0.01]:	100	100
- special bad (1) [" 0.01]:	100	100
- special bad (2) [" 0.01]:	0	0
- special bad (3) [" 0.01]:	0	0
- special bad (4) [" 0.01]:	0	0
- special bad (5) [" 0.01]:	0	0

OK Cancel Apply now Help

Live view

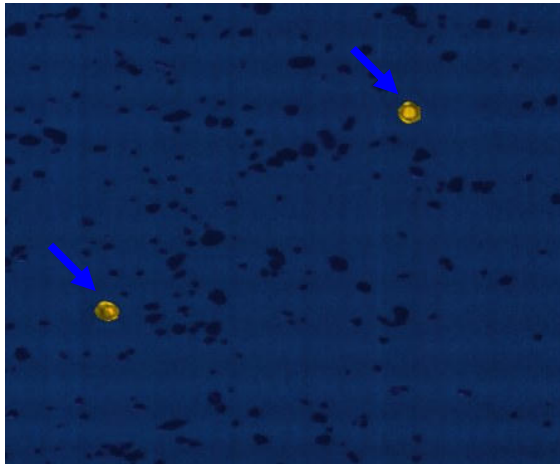
On the fly adaptation

Sorting statistics

For Help, press F1

sorted out [pieces] sorted out [t]: performance [t/t] 35 rejection rate [%] 21 mixture: 1

Example: Diamonds



Fraction	GemStar 600
+1 - 4mm	4t/h
+4 -10mm	10t/h
+10 -30mm	30t/h

Average yield: < 0.8% on -4+1 mm
 < 0.3% on -10+4 mm
 < 0.1% on -30+10 mm

Recovery:



Gems : $p > 95\%$



Near Gems : $p > 90\%$



Boarts : $p > 50\%$

GemStar®: Diamond Sorter



- Working width 300 or 600 mm
- Grain size 1 – 30mm
- Throughput up to 30 t/h
- Detection of non-fluorescing diamonds
- IP65 enclosed and air conditioned

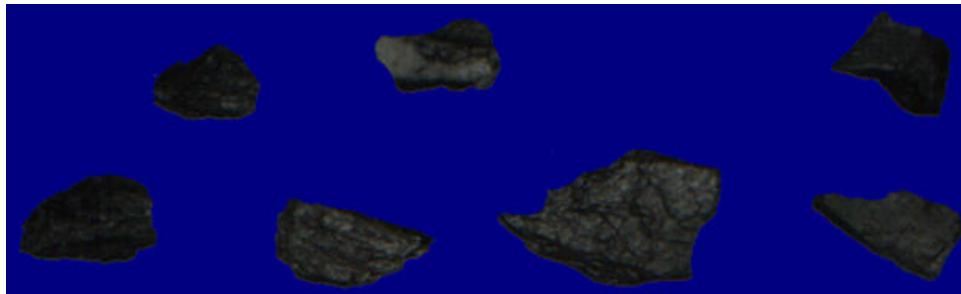
The Gemstar® is also available for other applications

Example: Gold / Base Metals

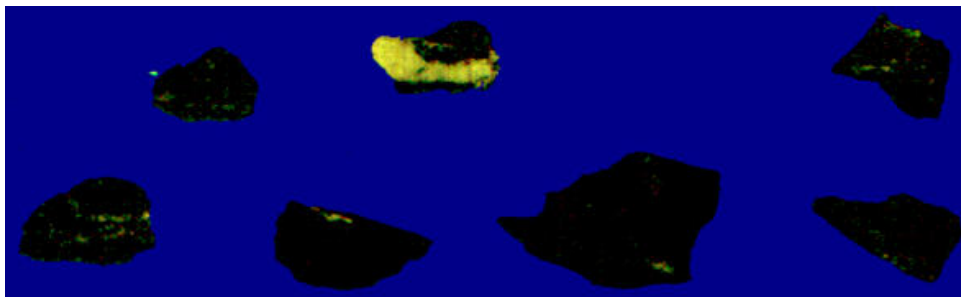
Turning the invisible into visible by using adapted top light means

- increasing the reflection of the metal
- reducing the reflection of all other barren rock areas

compared to the human eye based decision.



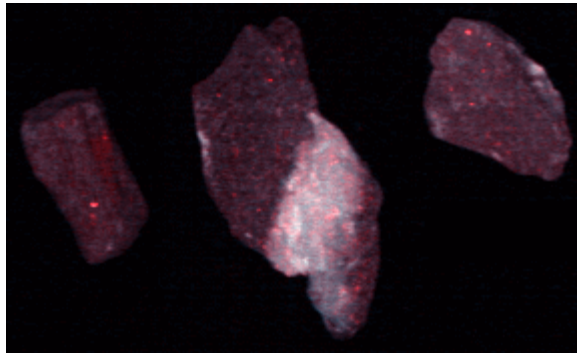
Picture taken with normal
white top light



Picture taken with
adapted top light

Example: Gold / Base Metals

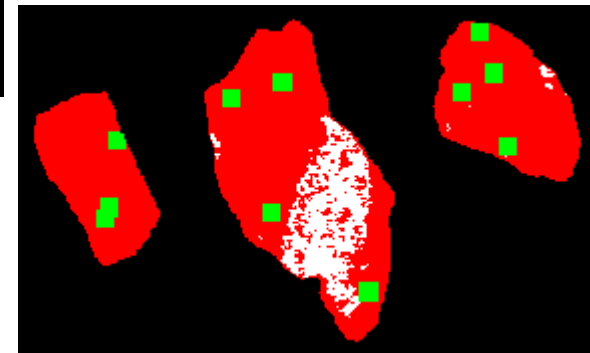
Image improvement due morphological operation:



The red dots in the original picture indicate gold.



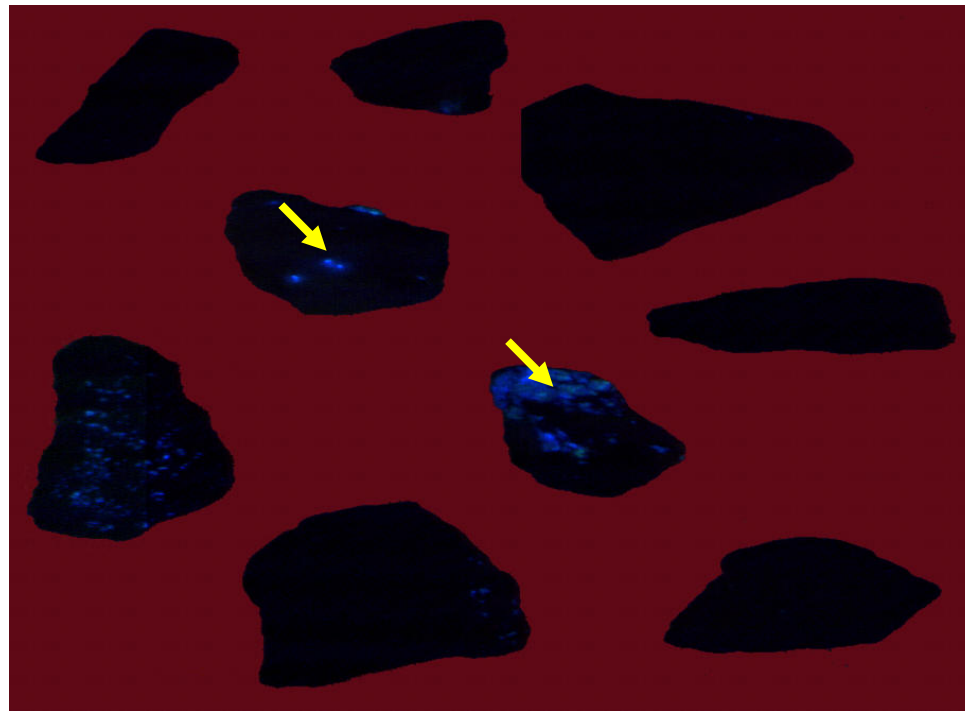
The surface percentage (green) of gold is too small for proper classification.



After morphological filtering the surface percentage has increased and the classification is possible.

Example: Tungsten ore

Top light with a UV wavelength creates fluorescence on the Surface of Tungsten ore.
The human eye is not able to sort this material.





OptoSort®

Thank you for your interest