Real-Time Hyperspectral Material Classification Platform for Industrial Sorting

Fact sheet

Description of the result

Developed and validated a real-time hyperspectral imaging platform for automated classification of refractory materials on a conveyor belt. The system identifies and sorts used refractories into recycling categories using spectral and multivariate analysis, demonstrating reliable inline performance and smooth integration with other sensing and sorting technologies.

Scan to learn more about material classification with HSI

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Problem addressed

Efficient recycling of used refractories is hindered by their heterogeneous composition and contamination. Manual sorting is slow and inaccurate, reducing recovery and quality. Automated, reliable real-time material identification is needed to achieve high-throughput, sustainable recycling.

Main features & benefits

The solution combines high-speed hyperspectral imaging with robust multivariate modeling to deliver precise, real-time material classification on conveyor belts. High spectral and spatial resolution ensures accuracy under varying conditions, while adaptable models support optimization and new material classes. Its non-contact, continuous operation boosts sorting accuracy, throughput, and recycling yield, enhancing efficiency and sustainability in material recovery processes.

Contact & Further Information

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This project is funded by the European Union's Horizon Europe Framework Program (HORIZON) under the Grant Agreement Number: 101058310

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Target users /stakeholders

- Recycling and waste management firms needing automated, high-throughput sorting.
- Mining and raw material operators optimizing ore and mineral classification.
- Refractory and ceramics manufacturers pursuing closed-loop recycling and quality control.
- Equipment integrators and robotics providers developing automated sorting lines.
- Research and technology centers focused on process monitoring and circular economy.
- Environmental agencies and policymakers supporting sustainable resource recovery.

Who Is Leading the Development?

NORSK ELEKTRO OPTIKK AS

Fraunhofer ILT

RHI MAGNESITA

Exploitation potential

Exploitation potential as a standalone hyperspectral classification module, part of integrated sensor systems, or a customizable service, enabling licensing, OEM integration, and tailored deployments across recycling, mining, and process monitoring industries.

Technical facts

The solution includes 2 high resolution hyperspectral cameras working in the VIS-NIR-SWIR spectral region, custom broadband illumination sources and an industrial computer for control and data analysis. It can be mounted on top of most industrial conveying systems.

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