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MEASUREMENT REPORT

CHARACTERIZATION OF PAPER COATINGS

High-Speed Spectral Analysis of Coatings on Paper

nlir
MEMBER OF THE NYNOMIC GROUP

Mid-Infrared Reflection Measurement for Paper Coatings

NLIR's MIDWAVE Spectrometer provides a powerful solution for in-line, non-destructive monitoring of coated paper, delivering chemical selectivity and speed unmatched by traditional inspection methods. By measuring the mid-infrared response directly on the production line, it enables manufacturers to track coating composition and structure in real time, ensuring stability of high-speed industrial processes.

Unmatched speed and sensitivity enabling analysis of:

- **Release coatings.** Real-time verification of silicone layer presence, thickness, and curing quality.
- **Glossy/matte coated grades.** Monitoring of binder-to-pigment ratios, optical properties, and surface uniformity for print quality.
- **Barrier coatings.** Detection of polymer or clay-based layers for grease, moisture, and gas resistance.
- **Moisture and binder content analysis.** Essential for drying control and runnability.
- **Thickness and uniformity verification.** Preventing overconsumption of coating chemicals.
- **Defect and irregularity detection.** Early identification of missing layers, overcoating, or non-uniform surfaces.

WHAT MAKES OUR TECHNOLOGY STAND OUT?

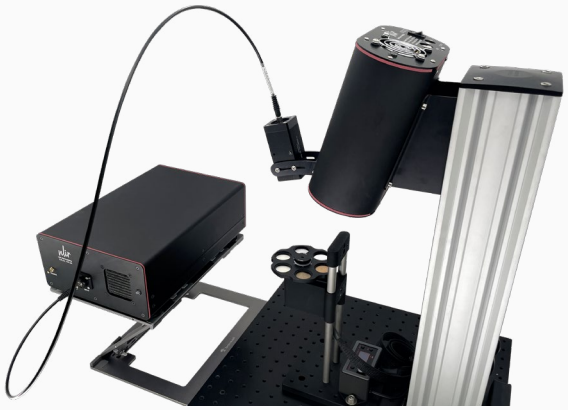
Live Monitoring
400 Hz full-spectrum readout rate enables real-time insights

High Sensitivity
130 k counts/(ms µW) with non-contact measurements

OEM Ready
Can be mounted in production environments to enable QA/QC

Excellent Service
Support for your specific application requirements

Measurement Case and Interpretation of the Results



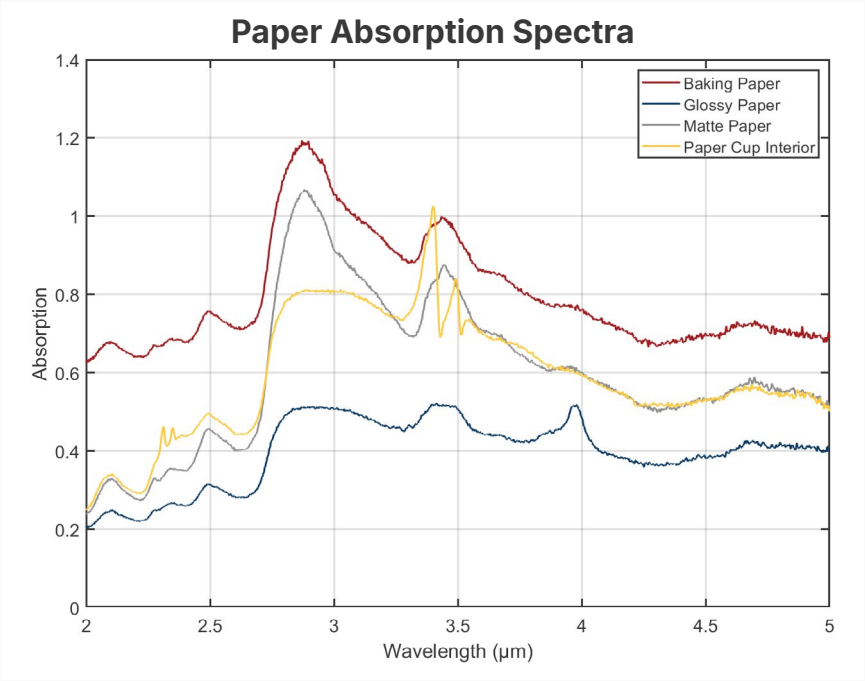
MEASUREMENT SET-UP

We have performed high-speed mid-infrared reflection spectroscopy on four different types of paper coatings using NLIR's MIDWAVE Spectrometer, AURALIS Light Source, SAMPLER Accessory, and a spinning sample wheel. The samples were measured at a speed of 60 RPM and the MIDWAVE Spectrometer is able to capture the spectral signatures of each coating efficiently as shown in the graph below.

KEY OBSERVATIONS

Looking at the spectra, we are able to easily distinguish different coatings on the paper surface: no coating, glossy coating, silicon coating (baking paper) and barrier layer coating.

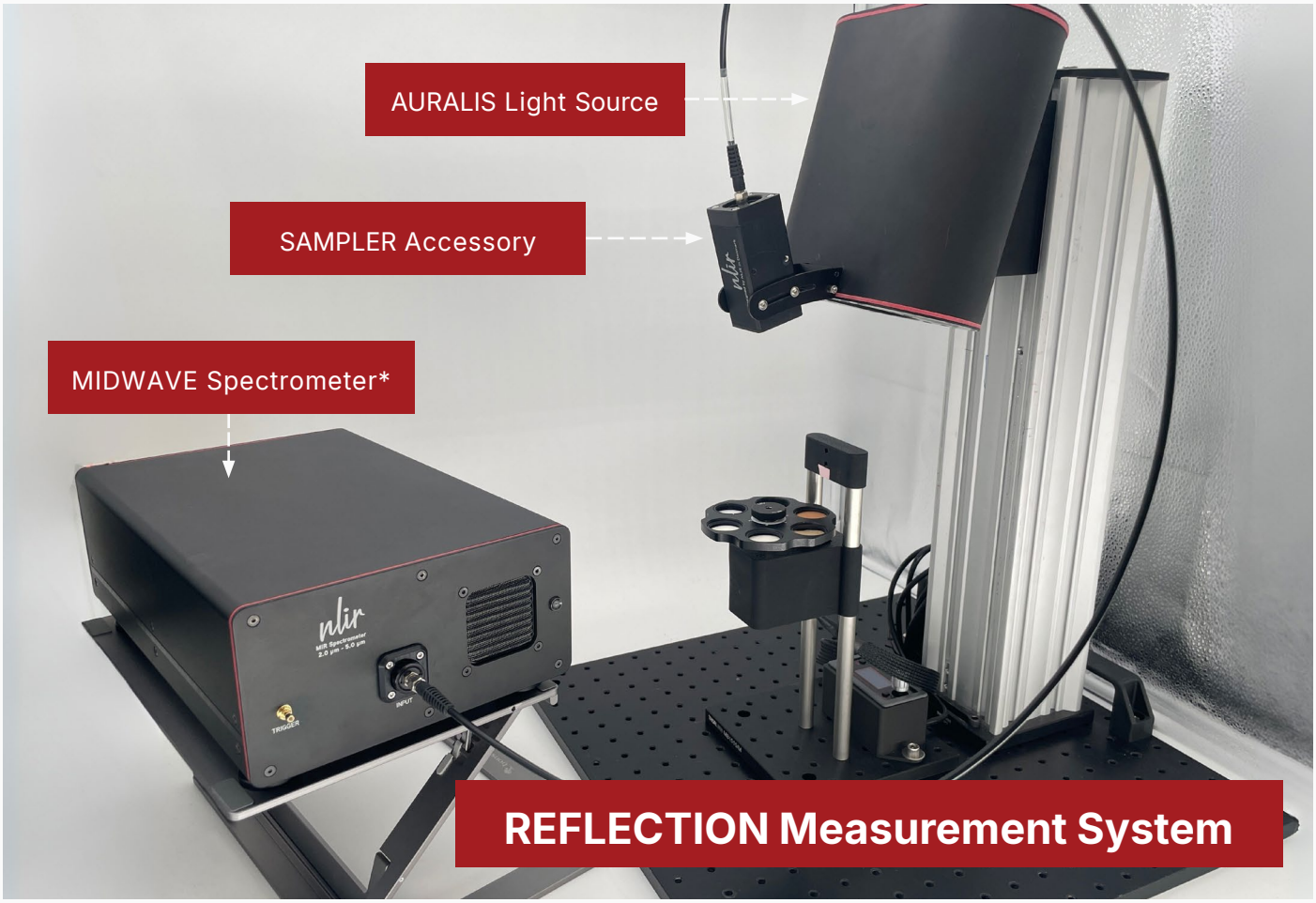
These differences highlight how NLIR's MIDWAVE Spectrometer can rapidly identify coating chemistry, thickness, and functionality, enabling precise inline monitoring across diverse paper applications.



The absorption spectra distinguish among different paper coatings:

- **baking paper** shows silicone signatures around 3.4 µm, confirming its release coating.
- **glossy and matte papers** exhibit mineral–binder absorptions (carbonates, clays, polymers) with intensity differences that reflect coating load and surface finish.
- **paper cup interior** reveals strong polymer barrier absorptions indicating polyethylene for liquid resistance.

Equipment Used to Perform the Measurements



*MIDWAVE Spectrometer comes with a custom-tailored NLIzeR Software

Would you like to explore your possibilities in industrial paper coating measurements?

If you are looking to optimize your paper characterization at an industrial level, our mid-infrared spectroscopy solutions can uplift your production line to new speed. At NLIR, we offer cutting-edge mid-infrared sensing solutions tailored to the needs of paper industry.

Contact us: info@nlir.com +45 7174 7870