

# Analysis of Active and Total Polysulfide in White Liquor

## ACTIVE POLYSULFIDE

The measurement of active polysulfide allows for catalyst optimization and maximizes polysulfide strength.

## INACTIVE POLYSULFIDE

The ability to measure inactive polysulfide overcomes the lengthy procedure associated with the gravimetric technique. Understanding inactive polysulfide (thiosulfate) content makes monitoring the deadload component in the recovery operation possible.

## RESIDUAL OL SULFIDE

Optical measurement of residual oxidized liquor sulfide eliminates the need for standard ABCs. This information optimizes the oxidation process.



[www.fitnir.com](http://www.fitnir.com)  
604-221-2230



- > **Simultaneous measurements of active and total polysulfide**
- > **Determines residual sulfide in oxidized liquor**
- > **Eliminates the need for gravimetric and standard ABC titrations**
- > **Optimizes catalyst and digester operations**

The measurement of true liquor properties in the Kraft liquor cycle has been a challenge for the pulp manufacturing industry. Much of the previous generation of analysis relies on techniques such as density, conductivity, and manual titrations. Over the past decade, the advancement of optical analyzers using techniques such as spectroscopy, particularly Fourier-Transform Near Infrared (FT-NIR), have been successfully applied to provide complete liquor composition measurements. As the technology matures, more applications are being developed.

Polysulfide (PS) is formed from the catalytic (activated carbon or manganese-based) oxidation of the white liquor (WL) sulfide to form di-, tri-, and penta-sulfide. These longer chain polysulfides have been shown to improve pulp yield through the retention of hemicellulose.

Measurement of PS has been difficult due to the need to accurately quantify both the active and inactive PS. UV light (416 nm) is used for determining active PS, but requires large dilution affecting sulfur chemistry and inducing errors in measurements. Gravimetric determination of total PS requires acidification, filtration, drying and weighing, leading to lengthy analysis time.

The application of FITNIR Benchtop for measuring active and total PS has been successfully implemented to quantitatively determine PS concentrations. Liquor samples from the process are transferred to a disposable vial, placed in the measurement slot and scanned. With the unique spectral features of PS, simultaneous determination of active PS, total PS, and residual sulphide is possible.

Rapid measurements for all three components allow for catalyst and digester optimization.