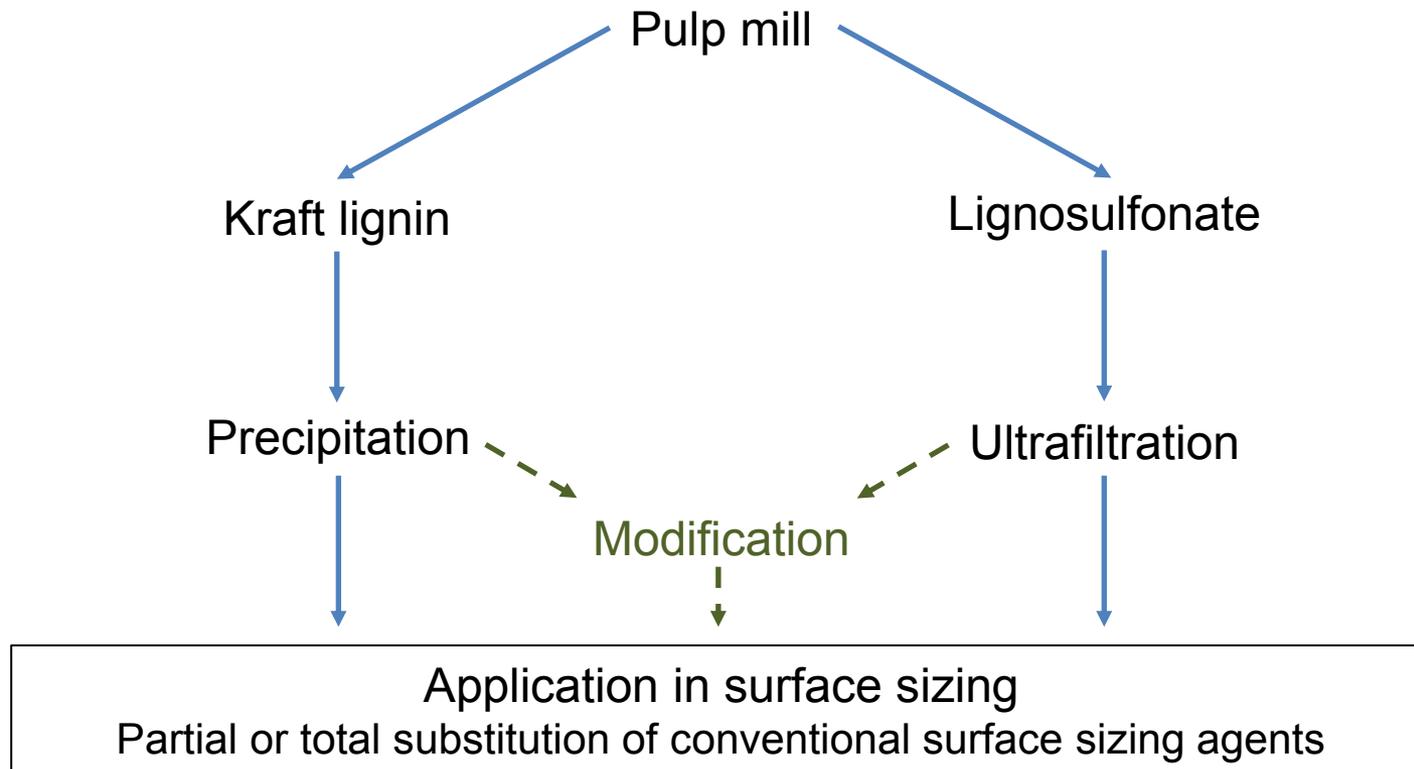


# The use of technical lignins in the development of surface sizing formulations for packaging papers

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# Approach and Methods



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## Facts about Technical Lignins

### Ultrafiltrated Lignosulfonates (LS)

- Water soluble at neutral pH
- Average Mw of ultrafiltrated LS ~ 9 kDa
- Surface sizing in neutral, acidic or alkaline conditions
- Further modification in aqueous system by e.g. enzymes possible



Lignosulfonate from ultrafiltration



Precipitated Kraft Lignin

### Precipitated Kraft lignin (KL)

- Water insoluble at neutral or acidic pH
- Average Mw of precipitated KL ~ 4 kDa
- Further modification by e.g. enzymes is not possible

**Challenge** ⇨ **Water solubility at neutral or slightly alkaline conditions!**

# Approach and Methods

## Transformation of Kraft Lignin

### Kraft Lignin H-Form



Precipitated Kraft Lignin

- pH ~ 2
- ZP = 0 mV

Stirring and pH adjustment  
using NaOH / H<sub>2</sub>SO<sub>4</sub>



Water soluble Kraft Lignin

- pH ~ 11.5
- ZP ≥ ±30 mV

Stirring and pH adjustment  
using NaOH / H<sub>2</sub>SO<sub>4</sub>



### Kraft Lignin Na-Form



Water soluble Kraft Lignin

- pH ~ 8
- ZP ≥ ±30 mV



Modification  
possible!!

Zeta potential measured with Stabino Charge Mapping [2]

[2] Suspension with ZP ≥ ±30 mV should be stable, [www.malvern.co.uk](http://www.malvern.co.uk)

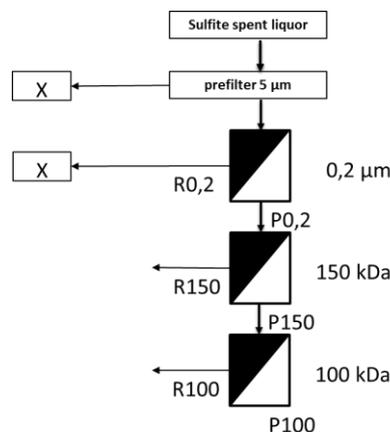
# Approach and Methods

## Precipitation and Ultrafiltration

Precipitation plant



Ultrafiltration



Precipitated Kraft Lignin



Laboratory drawdown coater



Lignosulfonate from ultrafiltration

## Industrial partners:



## Scientific Partners:



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Competence Centers for Excellent Technologies