

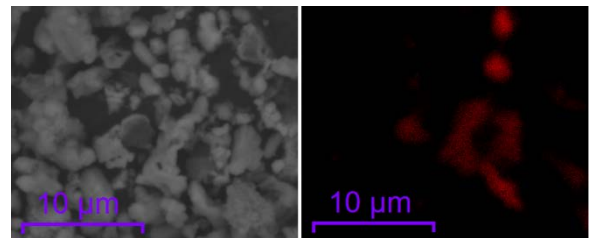
Lime cycle experiments

Common lime cycle problems

In order to ensure the adequate production of white liquor for the cooking process, the mill relies on a smooth operation of the lime cycle: the causticizing and the lime reburning stages. However, these vital pulp mill units can experience numerous problems, the most common being low causticizing degree, poor filtration and dewatering properties of lime mud as well as dead load and ring formation in the lime kiln. In many cases, these problems are connected to accumulation of non-process elements, e.g. Si, P, Al or Mg.

Innventia's laboratory expertise

Investigation of the reasons behind, and the solutions to, a lime cycle problem usually starts with a thorough analysis of the involved streams. Elemental composition, including non-process elements, of green and white liquor, lime mud, lime, lime kiln ESP dust and makeup is measured. Other important quantities, like free CaO of lime, EA and TTA of liquors etc. are also evaluated. If necessary, the chemical analysis of the solids is accompanied by other methods, e.g. electron microscope imaging. The results are compared with data from Innventia's extensive database of mill measurements.



Left: electron microscope image of a lime kiln dust sample. Right: mapping of phosphorus distribution (red) in the same sample by X-ray spectroscopy. By comparing the two pictures, it can be seen which particles are enriched in P.

The causticization experiments are conducted at carefully controlled temperature. Causticization degree is calculated after ABC-titration of filtered liquor. The composition of liquor and lime can be modified in order to simulate different conditions at the mill, e.g. introduction of a new process solution and its effect on the operation of the lime cycle.



Lime mud samples changing colour upon addition of iron during laboratory causticizing-calcination experiments

Next step involves calcination experiments in Innventia's laboratory oven. The oven can be heated to 1500°C and the atmosphere can be adjusted, from inert (N₂) to custom-supplied gas mixtures. This type of experiment is a very good approximation of a regular lime kiln operation and provides valuable knowledge about the condition of your lime mud and the achievable levels of free CaO.

Please contact us for a discussion about how we may help you!

Contact

Name: Marta Bialik

Phone: +46 8 676 7143

E-mail: marta.bialik@innventia.com

Name: Anna Jensen

Phone: +46 8 676 7223

E-mail: anna.jensen@innventia.com