

## PYROLYTIC GASIFICATION OF Na, Ca AND Mg BASE SPENT PULPING LIQUORS

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## ABSTRACT

One high temperature process presently being developed for pollution control and pulping chemical recovery is the Atomized Suspension Technique (AST). When this technique is applied to the treatment of spent pulping liquors under purely pyrolytic conditions, it offers the possibility of obtaining commercially significant quantities of by-product ammonia and methanol synthesis gases and certain unsaturated hydrocarbons from the lignin and other organics present in the spent liquors. Results of pilot scale pyrolytic experiments carried out in a 1' x 15' AST reactor with Na, Ca and Mg base spent liquors at 600 to 900 C reactor wall temperatures and 5 - 45 psig reactor pressures are described. The data is examined primarily from the gasification point of view, with particular attention to the influence of inorganic matter (the pulping base) on the product gas yields and compositions. At identical operating conditions, the Na base liquor gave the highest yields of synthesis gas, and the lowest yields of unsaturated hydrocarbons, while the Mg base liquor showed an opposite behaviour. The Ca base liquor produced intermediate yields of both products. Addition of  $\text{Na}_2\text{CO}_3$  to the Mg base liquor produced gas yields similar to the Na base material. The experimental results are compared to equilibrium data, and the effect of the various inorganic bases on the kinetics of the gasification reactions is discussed.