# Simultaneous Data Collection During Black Liquor Combustion By Warren Roberts, Matt Smith, and Ben Center

### Schematic of experiment layout and graph of simultaneous mass-loss, temperature, and diameter change





Schematic of experiment layout

Simultaneous diameter, internal temperature, and mass loss data for a 22 mg softwood/hardwood mixture black liquor droplet in 800 °C air

### Mass loss as predicted from MBMS and mass balance results



Droplet mass loss prediction from MBMS data in the 700 °C furnace



Comparison of mass loss between the balance data and the MBMS prediction for the low furnace temperature condition (700 °C)

### Surface Maps of a Droplet During Combustion



Surface temperature and emissivity distributions of the first of a series of two images of a burning droplet (in 700 °C air) – devolatilization and soot cloud. (left) emissivity, (right) temperature.

## Set-up for 3-D surface imaging



•A 3-D schematic of the constructed furnace with cameras ports in three orthogonal directions.

•Will enables us to recreate 3-D temperature profile.

•This will allow us to collect more extensive 3-D swelling information.

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