Development of a Phenomenological Model for Slurry Atomization

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U.S. Department of Energy
Office of Fossil Energy
Federal Energy Technology Center
P.O. Box 880
Morgantown, West Virginia 26507-0880

By
Adelphi University
Department of Physics
Blodgett Hall Room 2
Garden City, New York 11530

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PROGRESS SUMMARY

Task 1 – Extensional Viscometer

A contracting flow viscometer was designed and constructed by Adelphi University. Calibration was conducted using a variety of fluids and suspensions.

Task 2 – Testing

Testing using the extensional viscometer was performed using simulated fluids. Additional testing was performed using coal water slurries with dispersant and/or stabilizer to determine the concentration and shear dependence and the effect of additives. Viscoelastic effects will also be evaluated as a function of three coal concentrations for each coal water slurry in order to determine ϕ dependence.

Task 3 – Extension of the Phenomenological Model

The phenomenological model is being extended to include extensional and viscoelastic properties.

Task 4 – Development of Predictive Model for Atomization

A bench-scale atomization study is being conducted using simulated fluids and coal water slurries to determine the parameters on which the model is dependent. An essential piece of equipment failed during testing. The pump has been replaced and work is continuing. Due to equipment failure, a no-cost extension through July 1998 has been requested. When the testing is completed, a model will be developed for the Sauter Mean Diameter. A statistical analysis of the atomization data will relate the PSD to the dimensionless parameters.

ACTIVITIES SCHEDULED FOR THE NEXT QUARTER

All testing will be completed in the next few months. Modeling and the preparation of the final report will then be the focus.