WASHINGTON UNIVERSITY SEVER INSTITUTE OF TECHNOLOGY DEPARTMENT OF CHEMICAL ENGINEERING

FLUID DYNAMIC MEASUREMENTS AND MODELING OF LIQUID MIXING IN BUBBLE COLUMNS

by

Sujatha Degaleesan

Prepared under the direction of Professor M. P. Duduković

A dissertation presented to the Sever Institute of Washington University in partial fulfillment of the requirements for the degree of

> Doctor of Science August, 1997

Saint Louis, Missouri