INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	Fahad M K
Roll Number	:	126107038
Programme of Study	:	Ph.D.

Thesis Title: RECOVERY OF FINE COAL PARTICLES BY FLOTATION: HYDRODYNAMICS AND KINETICS

Name of Thesis Supervisor(s)	:	Prof. S. K. Majumder and Prof. Pallab Ghosh
Thesis Submitted to the Department/ Center	:	Chemical Engineering
Date of completion of Thesis Viva-Voce Exam	:	23/02/2021
Key words for description of Thesis Work	:	Flotation, Gas holdup, Mixing, Bubble Size Distribution; Flotation Kinetics

SHORT ABSTRACT

The thesis reports the experimental works which were carried out in the batch and continuous modes in the two- and three-phase systems to examine the effects of the concentration of the ionic (i.e., cationic and anionic) and non-ionic surface-active agents, particle size, slurry concentration, superficial gas velocity, and superficial slurry velocity on the gas holdup. The frictional pressure drop characteristics in a two- and three-phase flotation column was studied in the presence of different surfactants. The dispersion number was computed and analyzed in a three-phase counter-current flotation column. The velocity distribution model was used to analyze the axial dispersion phenomenon. The parameters of the velocity distribution model, dispersion due to bubble motion, and the velocity distribution characteristic factor were also determined under the given experimental conditions. The bubble size and its distribution in the coal slurry were studied and enunciated. The effects of the superficial gas velocity, slurry concentration, particle size, surfactant concentration, and axial height were enunciated. Experiments were conducted in a continuous flotation column to determine the degree of entrainment of the coal particles, and to examine its dependence on surfactant concentration, particle size, slurry concentration, superficial gas velocity, and superficial liquid velocity. Experiments were carried out to interpret the effects of different operating variables in the presence of cationic and anionic surfactants on the recovery of fine coal particles in the flotation column. The kinetics of the cumulative recovery was determined. The flotation rate constant and induction time were analyzed based on the recovery efficiency, incorporating the stability, attachment, and collision efficiencies of the particles with the bubbles. The thesis work may be helpful in mineral industry in the relevant field.