

Effect of solid particles on flow regimes in bubble columns

^{1,2}Mena P.C., ¹Plzánková M., ¹Ruzicka M., ¹Drahoš J., ¹Večeř M., ³Wichterle K., ⁴Teixeira J.A.

¹ Institute of Chemical Process Fundamentals, Czech Academy of Sciences, Rozvojova 135, 16502 Prague, Czech Republic (ruzicka@icpf.cas.cz)

² Department of Chemical Engineering, Faculty of Engineering, University of Porto, 4200-465 Porto, Portugal

³ Technical University Ostrava, Department of Chemistry, Trida 17. listopadu 15, 70833 Ostrava Poruba, Czech Republic

⁴ Centre of Biological Engineering - IBQF, University of Minho, 4710-057 Braga, Portugal

Key words: bubble column, flow regime, solid particles

Bubble column contacting/reacting systems are widely used in many technologies of chemical and food industry, in biotechnology, and in environmental areas. The transport parameters of the system depend strongly on the flow regimes inside the apparatus (homogeneous and heterogeneous regimes). One regime can change into another at critical values of control parameters - system size and geometry, physico-chemical properties of the phases, etc. This study concerns the effect of the presence of solid particles (almost neutrally buoyant 3-mm alginate beads) on the flow regimes. Experiments were performed in cylindrical bubble columns at different solid loads. The results indicate that the presence of solids can both increase and decrease the gas holdup and the extent of the homogeneous regime.

Supported by GAČR (Grant No. 104/04/0827) and by the EC (BEMUSAC Project No. G1MA-CT-2002-04019 and Marie Curie Training Site Fellowship of P. C. Mena at the Institute of Chemical Process Fundamentals, Prague, CZ, Contract Number HPMT-CT-2000-00074).