Unexpected effect of small viscosity on flow regimes in bubble columns


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, viscosity

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 in the apparatus (homogeneous and heterogeneous regimes). One regime can change into the other at critical values of control parameters - system size and geometry, physico-chemical properties of the phases, etc. This study concerns the effect of the liquid phase viscosity on the extent the homogeneous regime. Experiments were performed in cylindrical bubble columns with solutions of different Newtonian viscosity. The data show that the uniform regime can be both supported and deteriorated with small changes in viscosity.

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).