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计算流体力学在顺流喷雾干燥器模拟中的误差源研究

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摘要 The paper is focused on identifying error sources in computational fluid dynamics (CFD) predictions of a spray drying process. Seven groups of drying and atomization parameters were selected for analysis and 13 simulation trials were performed. The theoretical results were compared with experimental data and sensitivity of the simulation results to the analysed factors was determined. The following parameters affecting the accuracy of CFD spray modelling were found: gas turbulence model, particle dispersion, atomizing air, initial parameters of atomization and heat losses to the environment. A major difference in the errors committed during modelling of spray drying process for fine and coarse sprays was observed.

关键词 湍流方程, 颗粒喷雾干燥器, 模拟结果, 误差源,

分类号

An investigation of error sources in computational fluid dynamics modelling of a co-current spray dryer

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Abstract

The paper is focused on identifying error sources in computational fluid dynamics (CFD) predictions of a spray drying process. Seven groups of drying and atomization parameters were selected for analysis and 13 simulation trials were performed. The theoretical results were compared with experimental data and sensitivity of the simulation results to the analysed factors was determined. The following parameters affecting the accuracy of CFD spray modelling were found: gas turbulence model, particle dispersion, atomizing air, initial parameters of atomization and heat losses to the environment. A major difference in the errors committed during modelling of spray drying process for fine and coarse sprays was observed.

Key words error sources, computational fluid dynamics, spray drying process,

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