Evaluation of Micro Mixers Using Competing Reaction

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경쟁 반응을 이용한 미세혼합기의 성능 평가

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Key Words: Micro Mixer(미세혼합기), Competing Reaction(경쟁 반응), Micromixing Model(미세 혼합 모델)

Abstract : Since mixing of the fluid flowing through microchannels is important in microfluidic systems, many ideas for mixing methods have been proposed. To determine the best mixing method, it is important to develop an appropriate evaluation method. In this paper, two micro mixers are fabricated and tested using a system of parallel competing reactions involving the Dushman reaction between iodide and iodate, coupled with a neutralization. By using the competing reaction, the influence of microstructure and flow rate on mixing performance is successfully investigated. In addition, a micromixing model is developed to estimate the mixing time. Based on the model, guidelines on test conditions are discussed.

固-氣 유동해석 기법을 이용한 여객 유동 해석

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Analysis of Passenger Flow by using the Technique for Particle-laden Flow Analysis

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Key Words: Passenger Flow(여객유동), DEM(이산요소법), Monte Carlo(몬테카를로)

Abstract : Algorithm for passenger flow analysis based on DEM(Discrete Element Method) is newly developed. There are lots of similarity between particle-laden two phase flow and passenger flow. The velocity component of 1st phase corresponds to the direction vector of calculation cell, each particle to each passenger, volume fraction to population density and the momentum equation of particle to the walking velocity equation of passenger, etc. And, the walking velocity of passenger is also represented by the function of population density. Key algorithms are developed to determine the position of passenger, population density and numbering to each passenger. To verify the effectiveness of new algorithm, passenger flow analysis for simple railway station model is conducted. The results for passenger flow in the model station are satisfying qualitatively and quantitatively.