부유입자가 있는 등방성 난류에 대한 직접수치모사

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DNS in Particle-laden Isotropic Turbulence

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Key Words: DNS(직접수치모사), laden-particle(부유입자), isotropic turbulence(등방성 난류)

Abstract : Particle-laden turbulence is frequently observed in nature such as the atmosphere and ocean, as well as in many engineering flows. Recently, as the dispersion of pollutant in environmental problem is of more interest, the study on the particle-laden turbulence is more important both for predicting the behavior of particles and for understanding the fundamental characteristics. Isotropic turbulence is a good example of turbulence for understanding its the properties because if Reynolds number is high, small scale turbulence has universal characteristics of isotropic turbulence without relevance to large scale turbulence. Thus, using direct numerical simulation of particle-laden isotropic turbulence, we investigate the correlation of fluid velocities along particle trajectories for finding fluid-particle interaction mechanism. Furthermore, the results of present study can be applied to development of a solid particle dispersion model.

직류 유전영동을 이용한 미세 채널에서의 입자의 분리

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Separation of Particles by DC-Dielectrophoresis in Microchannels

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Key Words: Dielectrophoresis(유전영동), Separation(분리), Particle(입자), Microchannel(미세 채널), Electrophoresis(전기영동), Electroosmosis (전기삼투)

Abstract : In electrokinetic transport of liquid and particles, the dielectrophoretic (DEP) force is also generated inside microchannels by the non-uniform DC electric field formed near an obstacle. The DEP force is proportional to the volume of particles; hence, it can be utilized to separate particles having different sizes. It is shown, for a simple straight channel having a rectangular obstacle, that a particle path is greatly affected near the edge of the block due to the DEP force. The trajectory of particles are predicted numerically, which shows a fairly good agreement to experimental results. The method is applied to separate two different sizes of particles in a channel network.