عنوان مقاله:

Dispersion and Deposition of Micro Particles over Two Square Obstacles in a Channel via Hybrid Lattice Boltzmann Method and Discrete Phase model

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خلاصه مقاله:

Dispersion and deposition of aerosol particles over two square cylinders confined in a channel in laminar unsteady vortical flow were investigated numerically. Lattice Boltzmann method was used to calculatefluid characteristics and modify Euler method was employed as Lagrangian particle tracing procedure toobtain particle trajectories. Drag, Saffman lift, gravity, buoyancy and Brownian motion are forces that were included in particle equation of motion. Augmentation of total deposition efficiency at staggeredarrangement started at lower stokes number in comparison with inline arrangement. Presence of secondobstacle increased deposition efficiency for Stokes number greater than 1. Particles having Stokes number smaller than 0.1, followed streamlines and were not captured by squares. Deposition efficiency increased slightly between Stokes numbers 1 to 5 with respect to stokes numbers from 0.1 to 1.Deposition efficiency had bigger growth rate at HD=5 with respect to HD=3. Ultra fine particles withstokes number smaller than 0.1 acted like fluid particles at their positions and dispersed in the vortices, in the periodic asymmetric behind the obstacles. Particles tend to move on vortices boundary as Stokes numbers increased from 0.1 to 1. At HD=3, particles could not move in the region between two obstacles.

کلمات کلیدی:

Lattice Boltzmann Method,Deposition Efficiency,Dispersion,Stokes Number,Square Obstacles

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