عنوان مقاله:

CFD Simulation of Parameters Affecting Hydrodynamics of Packed Beds: Effects of Particle Shape, Bed Size, and Bed Length

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خلاصه مقاله:

Packed bed reactors have many applications in different industries such as chemical, petrochemical, and refinery industries. In this work, the effects of some parameters such as the shape and size of particles, bed size, and bed length on the hydrodynamics of the packed beds containing three spherical, cylindrical, and cubic particles types are investigated using CFD. The effect of the combination of three particles types in a packed bed was also simulated. The simulation results show that flow channeling occurs in some parts of the bed which are not suitably covered by particles. It was also seen that flow channeling in the packed bed with cubic particles are more than those containing spherical and cylindrical particles. According to the CFD simulations, wake and vortex flows are created in all the beds, and the shape of particles affects these phenomena. The comparison of the pressure drop created in the packed beds indicates that the pressure drop in the packed beds having three particle types is lower than the packed beds containing only spherical, cylindrical, or cubic particles. Finally, the numerical results were compared with empirical correlations in the literature and showed good agreement.

کلمات کلیدی:

Bed size, Flow Pattern, Combination of particles, Packing shape, Stationary points