

عنوان مقاله:

Experimental Analysis of Wall Flow Pattern and Fluid Shear Stress Effects on Creeping Flow Field in Convergent-Divergent Microchannels

محل انتشار:

مجله آنالیز غیر خطی و کاربردها، دوره 11، شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 16

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خلاصه مقاله:

The flow of fluids including micron particles in micro channels and manufacturing microfluidics tools have been one of the important topics in last decades and are utilized in different industries. The research procedure is experimental in this work. The experimental tests are carried out on the flow in a convergent-divergent microchannel having $200\ \mu\text{m}$ height. The utilized experimental method in this research is particle tracking based on the xerography technique, observation, record and data processing. The results showed that the velocity of the particles in Y-direction has a great effect on their motion in the convergent-divergent channel. Study of the particles' sedimentation in different Reynolds showed that it can be eliminated the destructive effect of channel obstruction using convergent-divergent channel which is originated from increasing sedimentation in low Reynolds. The shear stress and velocity gradient are two main factors of the particles' velocity in the convergent-divergent channel. The results showed that the shear stress has an excessive impact on the particles' velocity than the velocity gradient. Moreover, besides the upper and bottom walls, side walls affect the particles' velocity. The flow of fluids including micron particles in micro channels and manufacturing microfluidics tools have been one of the important topics in last decades and are utilized in different industries. The research procedure is experimental in this work. The experimental tests are carried out on the flow in a convergent-divergent microchannel having $200\ \mu\text{m}$ height. The utilized experimental method in this research is particle tracking based on the xerography technique, observation, record and data processing. The results showed that the velocity of the particles in Y-direction has a great effect on their motion in the convergent-divergent channel. Study of the particles' sedimentation in different Reynolds showed that it can be eliminated the destructive effect of channel obstruction using convergent-divergent channel which is originated from increasing sedimentation in low Reynolds. The shear stress and velocity gradient are two main factors of the particles' velocity in the convergent-divergent channel. The results showed that the shear stress has an excessive impact on the particles' velocity than the velocity gradient. Moreover, besides the upper and bottom walls, side walls affect the particles' velocity.

کلمات کلیدی:

Solid-Liquid Flow, Convergent-Divergent Microchannel, Particles' Slip Speed, Precipitation

