

عنوان مقاله:

Numerical Simulation of Fluid Flow over a Ceramic Nanoparticle in Drug Delivery System

محل انتشار:

فصلنامه مواد پیشرفته و فرآوری، دوره 4، شماره 2 (سال: 1395)

تعداد صفحات اصل مقاله: 8

نویسندگان:

Mina Alafzadeh - Academic center for education, culture and research (ACECR), Yazd branch

Shahram Talebi - Department of Mechanical Engineering, Yazd university- Yazd, Iran

Mojdeh Azizi - Academic center for education, culture and research (ACECR), Yazd branch

خلاصه مقاله:

In this work, for better understanding of drug delivery systems, blood flow over a ceramic nanoparticle is investigated through microvessels. Drug is considered as a nanoparticle coated with the rigid ceramic. Due to the low characteristic size in the microvessel, the fluid flow is not continuum and the no-slip boundary condition cannot be applied. To solve this problem lattice Boltzmann method is used with the slip boundary condition on the particle surface. Furthermore, the effects of Reynolds number, Knudsen number and stiffness (which depends on the kind of material) on drag coefficient are investigated in this paper. The present results show that lattice Boltzmann method can be used accurately to simulate the effect of different parameters on drug delivery. Moreover, the results show that the accuracy of lattice Boltzmann method is the same as second slip boundary condition. Also, the effect of nanoparticle stiffness as the important parameter on the period of time to deliver drugs in system is demonstrated.

کلمات کلیدی:

Nanoparticle, slip boundary condition, Lattice Boltzmann Method, Drug delivery, stiffness

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1282737>

