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The dynamics of magnetic nanoparticle motion in a straight microvessel

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Abstract

In this study, we investigate the trajectory of magnetic nanoparticle flowing through a microvessel in the presence of cylindrical magnet. By using the equation of motion of particle in the presence of magnetic and fluidic forces, the motion trajectory of magnetic particle in the microvessel is calculated. Our numerical results show that the probability of trapping magnetic particles in the straight microvessel is a function of the intensity of the magnetic field, particle radius, particle magnetization, and diameter of vessel. In this study, we investigate the effect of particle radius, magnet magnetization, particle saturation magnetization and vessel radius on the trajectory of magnetic nanoparticle flowing through the straight vessel. The results show that with increasing particle radius, magnet magnetization, particle saturation magnetization and also with decreasing vessel radius, the probability of trapping a floating particle in the channel increases

keywords: microvessel, cylindrical magnet, magnetic nanoparticle, trajectory of particle, magnetic susceptibility

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