Abstract

Magnetohydrodynamic micropumps received more attention due to its application in pumping of biological and chemical specimens, such as blood, DNA, and saline buffers. In this paper the MHD flow in square microchannel has been numerically investigate with different working fluids and electromagnetic boundary conditions, PBS solution and sea water have been used as working fluids. The study covers a selected range of applied electric currents and magnetic flux to explore their effects on MHD flow and heat transfer. Thermal characteristics of MHD flow have been also studied by calculation the temperature distribution through MHD micropump region. The results obtained show a considerable effect of both of the applied electric and magnetic fields on the velocity and flow rate. The sea water gave higher velocity and flow rate compared with PBS solution, and there is a slight increase in temperature due to small effect of Joule heating.

Index Terms

Computer Science

Power Electronics
Keywords

MHD flow; microchannel; micropump; numerical investigation; electromagnetic.