

Small concentrations of a high-molecular-weight polymer have been used to create so-called “elastic turbulence” in a micro-scale serpentine channel geometry. It is known that the interaction of large elastic stresses created by the shearing motion within the fluid flow with streamline curvature of the serpentine geometry leads initially to a purely-elastic instability and then the generation of elastic turbulence. We show that this elastic turbulence enhances the heat transfer at the micro-scale in this geometry by up to 300% under creeping flow conditions in comparison to that achieved by the equivalent Newtonian fluid flow.