微梳狀結構之滑動黏滯及擠壓效應之數值研究

Numerical results in this work demonstrate that the flow around an oscillating electrode of a micro electrostatic comb drive is quite different from a Stokes flow. A vortex is observed in the region between the electrode and the substrate. This vortex slows down the fluid velocity and significantly increases the damping. Squeeze damping and viscous damping are important energy dissipation mechanisms in oscillating micro comb drives. The Knudsen number for micro comb drives indicates that the flow is a slip flow. The slip boundary conditions reduce the viscous and squeeze dampings by about 12.2%. Numerical results show that the numerical procedure proposed in this work is an effective tool in designing micro comb drives.