Design of Valve Less Micropump Using Preliminary Characteristics from Fluid Flow

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ABSTRACT
Cooling in advanced thermal systems is ever in demand. The administration of such cooling will need miniaturization of the current pumping system for small scale use. A valve less pump is one of the methods to create a small flowrate pump. The design has both the intake and exhaust in the same side. The fundamental aspect that a micropump will endure is analysed from fluid mechanics analysis, is a key in the design of the first model of the pump. The sizing and criteria of the pump is set based on fluid equations of mass, momentum and energy. A design is laid out by using computer aided design
(CAD) based on the voltage frequency that will be applied to the piezomaterial. The movement of the piezo material due to current will cause the fluid to move as the material will act as a diaphragm. The design is then analysed using computational fluid dynamics (CFD) from the frequency inputs and a steady flow design is simulated. The reading of the small flowrate is analysed and a proper method of designing the valve less pump is gathered.

KEYWORDS: CFD, Fluid Flow, Micropump