白金薄膜感測器應用於微流道的現地溫度量測

The compact heat sink is an array of microchannels, whose heat dissipation is excellently pronounced by Tuckerman and Pease in 1981. However, there are several issues still under dispute, such as what is the range of transition value of Reynolds number? What is the relation between Reynolds number, Nusselt number and Prandtl number? It is then necessary to figure out the micro-scale heat flow along a microchannel by means of the state of art in MEMS. This thesis used thin film evaporation process and silicon bulk micromachining to fabricate an array of on-site temperature sensors along a silicon, V-groove microchannel. The platinum thin film sensors as temperature sensors were evaporated on Pyrex 7740 glass beforehand. By anodic bonding technology, the silicon wafer, with a V-groove microchannel bonded with the Pyrex glass constitute the plate platform for the in-site measurement of temperature distribution along the microchannel directly. Besides, the compensation technique of convex corner compensation structure is demonstrated in this thesis. By this technique, the undercut of convex corners at the inlet and outlet of microchannel during wet etching process is prevented successfully. Therefore, the length of the microchannel after fabrication matches with the design value more accurately than the one without compensation.