



**METAL MOULD DEVELOPMENT AND MOULDING OF POLYMER MICROFLUIDIC DEVICES WITH FINE MICRO CHANNEL AND PILLAR STRUCTURES**

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The injection moulding process has been recognised as a reliable and economic method for mass production of disposable polymer microfluidic devices for many diagnostic, genetic analysis, drug development and food quality analysis applications. There are many types of microfluidic chips with overall dimensions varying a few millimetres to a few hundred millimetres. Lithographic and electroplating methods have been developed and used to manufacture nickel moulds for injection moulding of microfluidic chips with small overall dimensions. However, for injection moulding of polymer chips with large overall dimensions, metal moulds with fine micro structures are preferred as there are limitations such as low wear resistance and rigidity, high warpage and residual stresses in using large nickel moulds. In this paper studies have been conducted to develop fine feature metal injection mould manufacturing and moulding process technologies for polymer microfluidic device manufacturing applications. Metal micro moulds have been machined using a 5-axis ultra-precision machine. Microfluidic devices with fine micro channel and micro pillar structures features down to a few tens of micro meters have been designed and manufactured using the injection moulding process.