

國立臺灣大學技術行銷表

台大案號: 06A-101015

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產品/技術名稱	新世代微流體平台-高效能微幫浦之增效設計		
發明人/單位	王安邦/台大應力所教授, 謝明哲/台大應力所博一生, 蔡文惠/台大應力所 97 碩士		
產品/技術說明	<p>高效能微幫浦可高度客製化整合於各種需要準確操控微量流體的應用中；在兼顧生物相容性與系統整合性之考量，整體設計利於採用生物可分解塑膠為基材，不僅大幅提升大規模生產之可能，在單價普遍偏高的微幫浦市場中取得成本領先之契機，更是符合盛行之環保議題。</p>		
應用範圍	<p><u>應用領域</u>： 生物工程、生醫藥學、電子冷卻與封裝、再生能源、微流體控制相關等領域</p> <p><u>適用產業</u>： 生醫檢測晶片、微投藥、植入式晶片、水冷式散熱模組、燃料電池之各式微量流體驅動控制</p>		
產品/技術優勢	<p>本產品與現有之主流技術相比主要優勢在於其結構簡單且微流道中無動件之設計，因此像是一般微幫浦可能遭遇之問題如閥門疲勞損壞、阻塞及易對流體中細胞分子造成破壞等弊處皆可避免；而設計簡單之特色亦使得其容易整合至各式應用中。此創新製程技術整體採用生物相容性高且加工成本較低之塑膠材料為基材，讓需要量產化的可拋棄式晶片之實現不再是空談。本產品與現有主流技術之比較，請見下表。</p>		
		現有主流技術	高效能微幫浦
	製程上之複雜性&難易度	製程步驟繁多且複雜	製程簡單且省時
	產品體積與可攜帶性	體積較大，不利攜帶	體積較小，方便攜帶
	可量產性之評估	不適合	適合
	拋棄式晶片之可實現性	低	高
	可動元件疲勞磨損之問題	有	無
	對流體中細胞等分子結構之破壞	會	不會
	與其他應用 統之整合性	較困難	較容易
產品使用壽命	較短	較長	
市場潛力	<p>根據微流領域相關產業分析統計結果顯示：從 2009 年所需微流體元件數目約 500 萬個單元的產量，預估到 2015 年總產量約可攀升至 3000 萬個單元，此一大幅成長即代表微流體技術急速拓展至各個相關應用領域，也意味著為微幫浦市場的極大潛力與發展性。</p>		
產品/技術 智財權保護方式	專利申請中		
圖片			

Marketing Abstract of NTU's Invention Disclosure

NTU's docket no: _____ (由產學合作中心填寫)

CIAC contact : _____ Tel : _____ e-mail : _____

Title	A novel microfluidic platform – Performance-enhancing design and fabrication of micropump																												
Inventor (s)	An-Bang Wang, Ming-Che Hsieh, Wen-Hui Tsai																												
Brief Description	<p>The system can be easily customized into the application in demand of microfluidic manipulation. Its characteristic of high efficiency answers to the spirits of conservation of energy. In consideration of bio-compatibility and integration of system, the plastic is chosen as a base material in order to enhance the possibility of mass production. This also wins a leadership in the keen market of micropump.</p>																												
Fields of Application	<p>Fields of Application: Bioengineering, Biomedicine, Cooling and electronic packaging, Power engineering etc.</p> <p>Industries of Application: Biomedical inspection chip, Micro-dosing, Implantable chip, Water-cooling module, Fuel cell etc.</p>																												
Advantages	<p>The advantages of this system are its simple structure and designs of non-moving part. Therefore, the common drawbacks of micropump such as valve fatigue, clogging and damage to cells in the fluid can be avoided, and it's easily integrated with other systems in each application due to its merits. Furthermore, the plastic is chosen as a base material because of its high bio-compatibility and low cost in machining processes, so the disposable chip can be certainly realized. Especially, the point of care testing gradually prevails nowadays, and the superiority of this product is more obvious. The comparison of this product and conventional techniques is shown as the following table.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 30%; text-align: center;">Conventional micropump</th> <th style="width: 30%; text-align: center;">High-efficiency micropump</th> </tr> </thead> <tbody> <tr> <td>Complexity in machining</td> <td style="text-align: center;">Numerous steps and complicated</td> <td style="text-align: center;">Simple steps and time-saving</td> </tr> <tr> <td>Portability</td> <td style="text-align: center;">High (larger volume)</td> <td style="text-align: center;">Low (smaller volume)</td> </tr> <tr> <td>Mass production</td> <td style="text-align: center;">Unsuitable</td> <td style="text-align: center;">Suitable</td> </tr> <tr> <td>Realization of Disposable chip</td> <td style="text-align: center;">Low</td> <td style="text-align: center;">High</td> </tr> <tr> <td>Wear & fatigue of structure</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">No</td> </tr> <tr> <td>Damage to cells in the fluid</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">No</td> </tr> <tr> <td>Integration in each application</td> <td style="text-align: center;">Harder</td> <td style="text-align: center;">Easier</td> </tr> <tr> <td>Product lifetime</td> <td style="text-align: center;">Shorter</td> <td style="text-align: center;">Longer</td> </tr> </tbody> </table>			Conventional micropump	High-efficiency micropump	Complexity in machining	Numerous steps and complicated	Simple steps and time-saving	Portability	High (larger volume)	Low (smaller volume)	Mass production	Unsuitable	Suitable	Realization of Disposable chip	Low	High	Wear & fatigue of structure	Yes	No	Damage to cells in the fluid	Yes	No	Integration in each application	Harder	Easier	Product lifetime	Shorter	Longer
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Market Potential	<p>According to the analyzing result of the microfluidics industry, it said that the yield of microfluidic devices is about 500 million units. By the corresponding estimation, the demand will rapidly grow up to 3,000 million units, and it means that the microfluidic techniques broadly spread to its related applications. This also implies the great potential of micropump in next several years.</p>																												

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