

# 便攜式基因(DNA)即時感測器 Portable Real-time DNA Biosensor

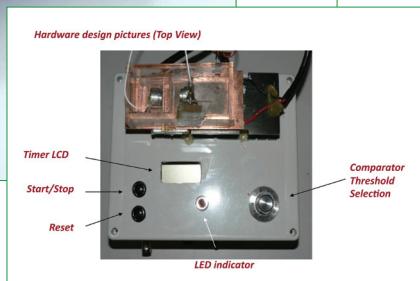
## 即時鑑定微生物身份的全自動檢測系統

Enable instant automatic identification of the presence of microorganism

在生化武器防範、社區健康監督的領域，迫切需要迅速鑑定病原體的方法。最精準、常用的微生物鑑別是以聚合酶鏈式反應(PCR)/DNA為基礎的方法。儘管大多數PCR/DNA鑑別設備也宣稱小巧，其實這只是限於PCR反應池，以(PCR)/DNA為基礎的鑑別方法系統，仍需要體積龐大的螢光照明和檢測裝置，方能完成整個檢驗測試。此外，這些傳統設備都需要交流電源以及恒濕環境，不能即時得悉測試結果，因此，既無法防範生化武器、也不適用於健康監督領域。理大科研專家最近已成功開發一套便攜基因感測器，其採用全新以基因為基礎的生化物理轉換方法，能對微生物作出即時快速測檢，辨別其種類。而且這感測器輕巧、易用、可以電池供電，方便攜帶，絕對可提高檢測生化武器、監督社區健康等工作的效率。



便攜式基因即時感測器包括了測試樣本培植槽和凝塊自動檢測裝置  
This hardware provides an incubation environment and auto-detection of clotting



For biological weaponry and health surveillance purposes, there is a strong need to identify pathogens in the field rapidly. The most accurate microbial identification relies on polymerase-chain-reaction (PCR)/DNA-based identification methods. While most PCR/DNA identification equipment claimed to be of small sizes, most of them only refer to the PCR chamber. The bulky fluorescent illuminator and detection device are always excluded from their calculation. Further, these classical equipment require a.c. mains supply and wet laboratory facilities support but give no real-time readings. Hence, these classical equipment are not portable by nature and unsuitable to be used in the field.

### Principal Investigators

Prof. Samuel Chun-lap LO, Prof. Derek Siu-wing OR  
Department of Applied Biology & Chemical Technology,  
Department of Electrical Engineering

### Contact Details

Institute for Entrepreneurship

Tel: (852) 3400 2929 Fax: (852) 2333 2410 Email: pdadmin@polyu.edu.hk

Patent No.: 12/813,488 (US), 201110155007.7 (China), PCT/CN2011/075559 (PCT)

### 特色與優點

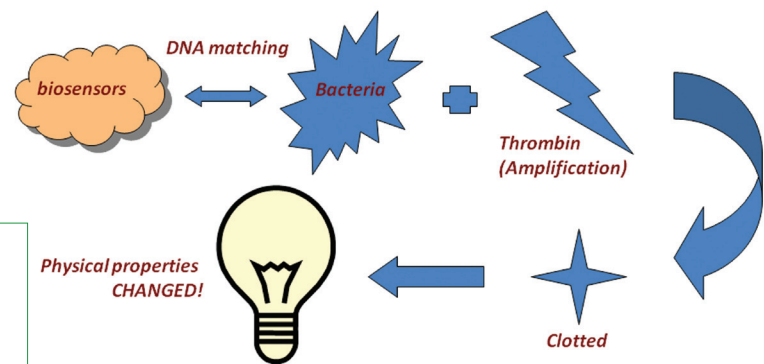
- 輕巧外型、方便攜帶，並能以電池驅動
- 採用全新以基因為基礎的生化物理轉換方法，可即時、實地得悉測檢結果
- 全自動模式運作，無須其他大型實驗室儀器輔助，能縮短檢測時間，同時減輕人手壓力

### 應用

適可用於生物防禦、醫院、臨床診斷、軌道交通系統等；同時，本設計亦可用於懷疑被病原體和/或其他不良微生物感染的領域。

### 獎項

第39屆瑞士日內瓦國際發明展 - 金獎 (2011年4月)



本感測器的理論與概念  
Methodology of the biosensor

Patent No.: 12/813,488 (US), 201110155007.7 (China), PCT/CN2011/075559 (PCT)

### Special Features and Advantages

- Hand-held, battery-operated and self-contained sensing device
- Be built upon a novel DNA-based bio-chemo-physical conversion method for real-time, rapid, in-situ detections of the presence of a microorganism of interest
- This fully-automated sensing device can be used in the field without the support of a.c. mains supply and laboratory facilities.

### Application

Suitable to be used in areas related to bio-defense, hospitals, clinics, mass transit systems, areas suspected to be contaminated with pathogens and/or other undesirable microbes.

### Award

Gold Medal - 39th International Exhibition of Inventions of Geneva, Switzerland (April 2011)