

國立臺灣大學技術行銷表

台大案號: 02A-100702 (由產學合作中心填寫)

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產品/技術名稱	具有表面電漿共振效應的光電能轉換元件
發明人/單位	何恕德 台大物理系 蔡定平 台大物理系
產品/技術說明	本發明之光電能轉換元件為建構在具有內全反射的光學結構上，利用內全反射的方式激發貴金屬 100 奈米尺度下之薄膜的表面電漿共振效應，其結果將使鄰近的光子吸收層的電場增強，進而導致入射光的散射與吸收增強。
應用範圍	本發明係關於一種光電能轉換元件，且本發明之設計將有助於發展超薄型太陽能電池、光偵測器、發光二極體，並且提升其光電轉換效率。
產品/技術優勢	此設計為以二氧化矽玻璃纖維與空氣作為具有內全反射的光波導結構，其中玻璃纖維為低成本、可大量製造之材料外，結合表面電漿共振效應後可大大地減少元件內光吸收層的厚度，因此該設計將可大量縮短光電轉換元件之製程成本，亦可其提高光電轉換效率。
市場潛力	本發明係利用入射光在高介電係數與低介電係數物質界面間以內全反射激發貴金屬薄膜或其奈米結構的表面電漿共振效應，以增加對入射光的吸收與散射，進而提升元件光電轉換效率，實施例中，所使用高介電係數物質為二氧化矽玻璃纖維，其為低成本可大量製造之材料，結合表面電漿共振效應後將可減少元件內光吸收層厚度，減少製程成本
產品/技術 智財權保護方式	專利申請中

Marketing Abstract of NTU's Invention Disclosure

NTU's docket no: 02A-100702 (由產學合作中心填寫)

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Title	A optoelectronic-converting device based on surface plasmon resonance
Inventor (s)	Shu-Te Ho, Din Ping Tsai
Brief Description	(≤ 100 words of non-confidential information) The device which converts light into electric power is based on an optical structure of total internal reflection by which surface plasmon resonance on sub-100 nm noble metal thin film can be excited. As a result, absorption and scattering of incident light will be intensified due to the enhanced electric field around photon absorber layer by surface plasmon resonance. Such design can be applied on thin film solar cell, photodetector, light-emitting diode, etc for further conversion efficiency. This design can help to save much fabrication cost and enhance conversion efficiency as well.
Fields of Application	Thin film solar cell, light-emitting diode, photocatalyst reactor, photodetector, biosensor, etc
Advantages	(when compared to the existing technologies) Waveguide coupler is a convenient and inexpensive way to excite surface plasmon polaritons, especially long-range ones and is much available for large-scale application as well. Long-range surface plasmon can enhance light absorption and scattering more than usual. When applied to optoelectronic devices, the technique will show higher power conversion efficiency.
Market Potential	The substrate can be commercial silica glass fibers, which are low-cost materials. Moreover, the structure in the patent can excite surface plasmon polariton and obtain long range surface plasmon which can enhance light absorption and produce intensified electric field. It turns out high power conversion efficiency finally.
IP Right(s)	Patent pending