

## Analysis of Plasmonic Subwavelength Crossed Metallic Grating in Ag/SiO<sub>2</sub>/Ag sandwich nanostructures

Hoang Yan Lin<sup>\*</sup> and Tsung-Han Tsai

Graduate Institute of Photonics and Optoelectronics, and Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan 10617, Republic of China

Accepted for publication on 16<sup>th</sup> June 2015

Recently, the novel metallic nano-structures applied to the solar cell as a ultrathin plasmonic absorber to greatly enhance the light absorption of semiconductor material, have attracted a great deal of attentions, through the strong evanescent field of the surface plasmons (SPs) surrounding the metallic nano-structures, and the enhanced light trapping by scattering, near the SP resonance wavelength in the literature. The optimized design of the metallic nano-structures is necessary for the ultrathin plasmonic absorber used in future thin-film solar cells. In our study, we investigate experimentally the significant light absorption in the visible range of the light absorber with the Ag/SiO<sub>2</sub>/Ag plasmonc subwavelength sandwich nanostructures, by tuning the geometry of the Ag grating on the top. It is found that the light absorption enhancement of the crossed-grating MIM sample is much larger than the 1D-grating MIM sample, as compared with the sample without metallic layer on the top of the SiO<sub>2</sub> film. It is also analyzed that the plasmon-enhanced light absorption of the MIM subwavelength nanostructures using the crossed Ag grating on the top is through the strong SPs resonance to efficiently enhance the field intensity in sandwich nanostructures, increasing the light absorption in the ultrathin plasmonic absorber. Our research provides the novel metallic nano-structures to enhance the energy absorption of ultrathin absorbers towards future high efficiency thin-film solar cell.

Keywords: plasmonics; subwavelength nanostructure; solar cell



## 能源挑战与力学国际研讨会摘要模板

## John Smith<sup>1\*</sup>, 張三<sup>2</sup>, 李四<sup>3</sup>

<sup>1</sup>School of Engineering, University of Aberdeen, Aberdeen AB24 3UE, UK <sup>2</sup>Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA <sup>3</sup>中国 北京清华大学工程力学系,北京100084

文件定义了摘要的各个组成部分,包括标题和全部作者,以及每个作者的所在单位、单位地 址和电邮地址。作者列表中标有\*号的为报告作者。请不要改变文件书写风格,包括字体、文 字大小和段落间距;不要在文件中使用特殊字符,符号或方程。

摘要将以英中文双语出现在研讨会文集里。美式和英式英文,简体和繁體中文都被认可。作 者可以用英文或英中文双语(首选)提交摘要;如果只收到英文版本,我们将提供论文摘要 的中文翻译。在英文版本的摘要中,单词总数必须在 250 到 350 之间。

论文摘要的版权属于作者。北海期刊会议有限公司有权将摘要发表在会议网页上。

关键词:摘要;模板;英文;中文(最多5个关键词)