

论文

面阵CMOS光纤光谱仪研制

孙小小, 黄梅珍, 汪洋

上海交通大学 物理系 光科学与工程研究中心, 上海 200240

摘要:

研制了一种以非对称交叉Czerny-Turner光路为结构的互补金属氧化物半导体小型光纤光谱仪样机,探讨了以面阵互补金属氧化物半导体图像传感器作为光电探测器的光度测量准确性和线性问题,分析了杂散光对吸光度测量的影响.结论是:通过光强定标和非线性修正后,互补金属氧化物半导体小型光纤光谱仪可以满足一般的应用要求,其光谱测量范围为380~800 nm,光谱带宽约6 nm,积分时间1~500 ms,波长准确度 ± 1 nm,光度准确度 ± 0.03 AU.该光谱仪具有小型化、低成本、速度快等优点.

关键词: 互补金属氧化物半导体 吸光度 光强定标

Development of Miniature CMOS Fiber Optic Spectrometer

Optical Science & Engineering Research Center, Department of Physics, Shanghai Jiao Tong University, Shanghai 200240, China

Optical Science & Engineering Research Center, Department of Physics, Shanghai Jiao Tong University, Shanghai 200240, China

Abstract:

The biggest advantage of a CMOS area array sensor is that it is less expensive than a CCD sensor. A miniature spectrometer use an area array CMOS sensor MT9M001C12STM as detector was developed. The prototype uses an asymmetric cross Czerny-Turner optical structure. Its photometric accuracy and linearity were investigated, and the photometric deviation arise from stray light was analyzed. The elementary performance was tested as follows: wavelength range 380~800 nm, the integration time can be selected from 1 ms to 500 ms according to the light intensity, spectral bandwidth 6 nm, wavelength accuracy ± 1 nm, photometric accuracy ± 0.03 AU. Results showed that after calibration and nonlinear correction, this CMOS spectrometer is capable for routine fast analysis.

Keywords: CMOS Absorbance Intensity calibration

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通讯作者: 黄梅珍(1966-),女,副教授,博士,主要研究方向为光检测和生物医学光学.Email: mzhuang@sjtu.edu.cn

作者简介:

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