上海大学学报(自然科学版) » 2008, Vol. 14 » Issue (6) :595-599 DOI:



# 基于熔锥光纤耦合器的溶液浓度传感器

史杰，陈振宜，庞拂飞，王廷云

(上海大学 通信与信息工程学院，特种光纤与光接入网重点实验室，上海 200072)

# Sensor for Solution Concentration Based on Fused Tapering Optical Fiber Coupler

SHI Jie,CHEN Zhen-yi,PANG Fu-fei,WANG Ting-yun

(School of Communication and Information Engineering, Key Lab of Specialty Fiber Optics and Optical Access Networks, Shanghai University, Shanghai 200072, China)





摘要 利用2×2熔锥型光纤耦合器，提出一种检测溶液浓度的新方法.首先，根据熔融光纤拉伸锥形曲线和超模耦合器理论，分析计算出熔锥型光纤耦合器输出分光可见度与其耦合锥区外部介质折射率的关系曲线；然后，实验上将2×2单模光纤耦合器浸入一种溶液中，当光经过熔锥耦合区后，其耦合分光可见度将随锥区外部的溶液浓度（折射率）而变化.由此，可实现对溶液浓度的检测.理论计算和实验结果有较好的一致性.

关键词： 光纤传感器 熔锥型耦合器 折射率 溶液浓度 分光可见度

Abstract： A new method for measuring concentration of solutions using a fused tapering coupler of optical fiber is reported. According to the shape-curve function of a fused tapering fiber and the super-mode coupling theory,relation between output coupling visibility (CV) of the coupler and refractive index of the medium surrounding the coupler is investigated. A 2×2 fused tapering single-mode optical fiber coupler is immersed into a solution in the experiment. When light is injected into the coupler, the CV is changed with variation of solution-concentration (refractive-index) surrounding the fused tapering zone of the couple. The solution-concentration sensor is realized. The theoretical and experimental results are in good agreement.

Keywords： optical fiber sensor, fused tapering coupler, refractive index, solution-concentration, coupling visibility

收稿日期: 2007-09-27; 出版日期: 2008-12-21

通讯作者 陈振宜



引用本文:
史杰, 陈振宜, 庞拂飞等 .基于熔锥光纤耦合器的溶液浓度传感器[J] 上海大学学报(自然科学版), 2008,V14(6): 595-599

SHI Jie, CHEN Zhen-yi, PANG Fu-fei etc .Sensor for Solution Concentration Based on Fused Tapering Optical Fiber Coupler[J] J.Shanghai University (Natural Science Edition), 2008,V14(6): 595-599

链接本文:
http://www.journal.shu.edu.cn//CN/ 或 http://www.journal.shu.edu.cn//CN/Y2008/V14/I6/595

没有本文参考文献

[1] 向晓婷;姚寿铨.长耦合区光纤熔锥型温度传感器[J]. 上海大学学报(自然科学版), 2008,14(2): 121-124

[2] 石志东;董小鹏;唐明珏;李杰.D形光纤样品制备及其Bragg光栅的实验测量[J]. 上海大学学报(自然科学版), 2007,13(4): 415-420