

激光活化和化学镀制造聚酰亚胺表面柔性导电图案

任俊¹, 李东亚¹, 张阳², 刘禹^{1,*}¹江南大学, 江苏无锡, 214122²丹麦科技大学, Lyngby, 2800

*Email: jun.ren.001@foxmail.com

摘要: 聚酰亚胺基材上制造柔性导电图案在可穿戴设备、生物医学、汽车和能源采集器等领域引起了越来越多的研究兴趣。本文报告了一种用于化学镀金属化的激光诱导选择性活化工艺 (laser-induced selective activation, LISA), 用于在聚酰亚胺基材上创建复杂的导电图案。在该工艺中, 利用Q-switched脉冲激光器扫描表面并形成由微孔结构组成的催化层, 这增强了聚酰亚胺表面的化学镀金属结构的稳定性, 并在反复弯曲和严苛环境下表现出良好的机械稳定性。金属图案的高分辨率使其能够形成线宽低至50微米的铜微网图案。此外, 利用LISA技术成功制造了柔性发光二极管显示电路和电磁干扰屏蔽膜, 表明该工艺具有良好的应用潜力。

关键词: 激光诱导选择活化; 微孔结构; 化学镀; 聚酰亚胺; 柔性电子

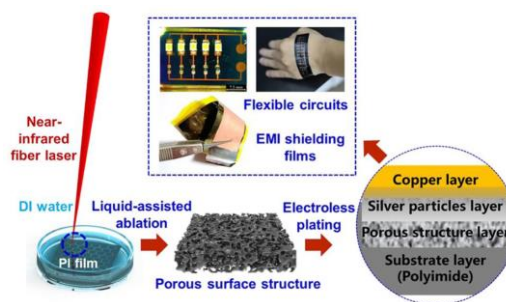


Fig. 1 Schematics of fabrication process of flexible electronic devices by laser-induced selective activation

参考文献:

- [1] Yanqiu Chen[†], Yu Liu^{*}, Wei Xu, Yang Zhang, Hengyong Nie^{*}, “Quantitative calibration of conductive pattern growth via electroless copper plating at nano-resolution”, *Surface Topography: Metrology and Properties*, 8, 2020, 035003.
- [2] Yanqiu Chen, Yu Liu^{*}, Jun Ren, Weizhen Yang, Erwei Shang, Kaixue Ma^{*}, Linghao Zhang^{*}, Jing Jiange, Xihu Sun, “Conformable Core-Shell Fiber Tactile Sensor by Continuous Tubular Deposition Modeling with Water-Based Sacrificial Coaxial Writing”, *Materials & Design*, 190, 2020, 108567.
- [3] Zhenyu Wang, Jun Ren, Rui Liu, Xihu Sun, Dandan Huang, Wei Xu, Jiang Jiang, Kaixue Ma, Yu Liu^{*}, “Three Dimensional Core-Shell Structured Liquid Metal/Elastomer Composite via Coaxial Direct Ink Writing For Electromagnetic Interference Shielding”, *Composite Part A: Applied Science & Manufacturing*, 136, 2020, 105957.

.....

*报告人: 任俊; 手机号: 15995201230; 邮箱: jun.ren.001@foxmail.com