



Department of Electronic Engineering
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SEMINAR

Polymer-assisted metal deposition (PAMD) for Soft Electronics

By

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Abstract:

One solution-processible strategy, namely polymer-assisted metal deposition (PAMD), has been developed in our group, which allows ambient fabrication of flexible, foldable, stretchable, compressible, and wearable metal (especially Cu) conductors with very high conductivity. As shown in **Figure 1**, the key innovation of PAMD is the use of a thin and functional polymer interfacial layer that assists electroless deposition (ELD) of metal thin films and patterns (Au, Ag, Cu, and Ni) on soft substrates such as plastics, elastomers, papers, and polyurethane sponges. Such a polymer interfacial layer offers remarkable adhesion between metal and substrate, which is critical for enhancing the mechanical durability of the metal layer upon large deformation. In general, PAMD includes three steps. First, functional interfacial polymer such as (i.e., poly[2-(methacryloyloxy)ethyl] trimethylammonium chloride (PMETAC)) are anchored on various substrates at ambient conditions. And then, the catalyst precursors are immobilized into the polymer layer by ion exchange. Finally, the ELD process is performed and corresponding thin metal films are obtained. Importantly, PAMD is compatible with versatile substrates. Moreover, the patterned metal films can be readily fabricated by patterning the PMETAC nanoplatform or catalyst precursors. On the basis of these advantages, PAMD is employed to fabricate flexible, foldable, stretchable, and wearable metal conducting sheets (**Figure 1a**), patterned flexible and stretchable metal interconnects (**Figure 1b**), and stretchable and compressible 3D metal sponges (**Figure 1c**), respectively.

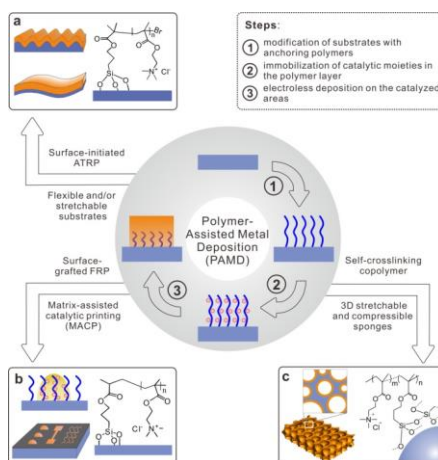


Fig. 1. Schematic illustration of polymer-assisted metal deposition (PAMD) and its various applications.

Biography:

Dr. Zijian Zheng is currently Associate Professor at the Institute of Textile and Clothing (ITC) at The Hong Kong Polytechnic University. His research interests are surface science, self-assembly, nanolithography, polymer science, and bendable/stretchable/wearable/graphene materials and electronic devices. He received his B. Eng. with honor from the Department of Chemical Engineering at Tsinghua University in 2003. Between 2004 and 2007, Dr. Zheng moved to the Department of Chemistry and Nanoscience Center at University of Cambridge for his PhD study under the supervision of Prof. Wilhelm T. S. Huck, where he worked on nanotechnology and organic optoelectronics. In 2008, Dr. Zheng joined the group of Prof. Chad A. Mirkin as a postdoctoral research fellow in the Department of Chemistry and International Institute for Nanotechnology at Northwestern University, working on the development of Dip-Pen Nanolithography and Polymer Pen Lithography. He joined ITC as Assistant Professor in 2009 and was promoted to tenured Associate Professor via a fast track. He has published ~60 papers in high-impact international scientific journals including Science, Advanced Materials, Journal of the America Chemical Society, Angewandte Chemie, and Nano letters. He also files 13 international and China patents. He serves as Guest Editor for Advanced Materials. He is recipient of several international awards such as GENEVA Innovation Award and Young Leaders Award in 2015.

*** All are welcome to attend ***

For inquires, please contact Prof. N Zhao, Tel. No. 3943 4347