Introduction

Printed Electronics is a technology that produces electronic devices on various substrates (such as glass, paper, polymer, etc.) through various printing techniques (such as drop coating,spin coating, Inkjet Printing, Screen Printing, etc.) The research of printing electronics focuses on the development of new conductive inks, the improvement of printing processes and the expansion of application fields.

Metal organic decomposition (MOD) and nanoparticle (NP) is the two core techniques of producing conductive ink. Due to various shortcomings of NP inks (such as high cost, clogging nozzle, etc.), this project focuses on copper - and silver-based MOD inks. Its basic principle is to let the metal compound and ligand reaction to form a metal ink, through the sintering method to deposit the metal onto the substrate, the rest of the substance through the gaseous phase out of the system.

Key points of this study include determining the optimal solution combination and various parameters in the coating process. The main experimental results of concern include low resistivity, stability of the coating, and adhesion to the substrate.

In this project, copper and silver are selected as coating metals, ethanolamine (EA) and 1-aminopropan-2-ol (AP) is used to prepare a series of inks. They were combined to form four different base inks: Cu-EA, Cu-AP, Ag-EA, and Ag-AP. Then, new inks were obtained by mixing them in pairs. The ratio at which these inks are mixed is also a question discussed in this study. These inks are deposited on glass and polymer respectively.

After coating various substrates, the films were characterized by XRD, SEM, contact angle, etc., in order to obtain further properties of the films.

MOD technology has a very wide range of applications, such as wearable flexible displays (for health monitors, high-end clothing, etc.), radio frequency tags for product tracking, printed bendable solar cells, and more.

Its advantages include lower production costs, more energy saving and environmental protection, flexibility that can be printed on flexible substrates, suitable for mass production, and high flexibility that can be customized on demand. Of course, it also has certain limitations, such as lower electron mobility and long-term stability than traditional silicon-based devices, so it is necessary to continuously develop better inks.