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Inkjet printed doped polyaniline: navigating through physics and chemistry for the next generation devices

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Abstract

Innovative benzidine-free PANI-based inks for electrically conductive inkjet printed devices were developed and tested and the results compared with those obtained by traditional PANI. The numerous characterizations performed NMR investigations evidenced the presence of quinones and phenolic groups on the backbone of the innovative PANIs that are thought being responsible for the higher solubility in DMSO. A mechanism of reaction was proposed. The numerous characterizations (NMR, UV-Vis, FTIR, XPS and electrical investigations) allowed to compare protonation level, doping level, valence band maximum for both the type of PANI.

The correlation among structural properties, printability, conductivity and solubility was discussed.

Keywords: polyaniline, films, inkjet printing

1. Introduction

Thanks to their unique properties, as electronic conductivity and easy preparation, intrinsically conducting polymers (ICPs) have become popular in many sectors ranging from tissue engineering¹ to regenerative medicine² and sensors³.

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