

## Αγγλική Περίληψη

“Inkjet-printed thin films for application in flexible organic photovoltaics”

The focus of this thesis is the optimization of the printing process, employing a piezoelectric inkjet-printer, for the realization of thin films for printed flexible organic photovoltaic devices. Indeed, all the films realized have been investigated by means of different characterization techniques, in order to assess their quality and, consequently, to evaluate the reliability of inkjet printing as a fabrication technique for such films.

In the first chapter, a general introduction to the field of inkjet printing, with particular focus on its working principle and applications in organic solar cells, is given. The second chapter provides information concerning the fabrication procedure followed, including a detailed description of the inkjet printing technology used. Also, a report about the main physical and chemical properties of the materials employed is presented. At the end of the second chapter, there is a brief description of the characterization techniques used. The third and the fourth chapters are fully dedicated to the results, concerning the fabrication and the characterization of inkjet-printed PEDOT:PSS and P3HT:PCBM thin films on flexible substrates. The influence of the solution and printing parameters on the quality of inkjet-printed PEDOT:PSS films is discussed. The optimized inkjet-printed PEDOT:PSS films were incorporated in printed flexible organic solar cells, in order to examine their functionality. Moreover, there has been an investigation of the morphological properties of inkjet-printed P3HT:PCBM films on PEDOT:PSS substrates, in correspondence to the active-layer thickness. Finally, a brief chapter reports a summary of the main results achieved, as well as a list of issues for further investigation.