

Single layer graphene from synthesis to integration in medical applications

Abstract

The doctoral thesis addresses a novel topic and has as main objective the integration of monolayer graphene in medical applications. To achieve this objective the main activities are i) synthesis of monolayer graphene by the chemical vapor deposition (CVD) method, ii) transfer of monolayer graphene from the catalyst substrate to different types of substrates depending on the application concerned, iii) functionalization monolayer graphene and control of the remarkable properties of this material and iv) integration of monolayer graphene in different applications: membranes, microfluidic platforms and electrochemical sensors. This paper is the basis for the further development of theranostics medical devices: diagnosis and therapy.

This doctoral thesis is structured in 2 parts: in the first part I present the Critical Stage of Literature Data. This part comprises 2 chapters: Chapter 1: Current state of research on monolayer graphene and Chapter 2: Use of graphene in applications.

Part 2 presents the Original Contributions structured as follows: Chapter 3: presentation of characterization methods, Chapter 4: Experimental data: obtaining graphene monolayer on target substrate: synthesis, transfer and characterization methods, Chapter 5: Properties of graphene obtained and their modification for use in applications, Chapter 6: Integration of monolayer graphene in applications - Manufacture of graphene-based membranes, Chapter 7: Integration of monolayer graphene in microfluidics and Chapter 8: Graphene - use as electrode material for electrochemical sensors.