

Graphene flexible electronics for neuroprosthetics

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Graphene and graphene-based materials possess a rather exclusive set of physicochemical properties holding great potential for biomedical applications, in particular neural prostheses. In this presentation, I will provide an overview on fundamentals and applications of several graphene-based technologies and devices aiming at developing an efficient bidirectional communication with electrogenic cells and nerve tissue. To this end, I will discuss several device technologies based on graphene that are used to investigate the electrical activity in cell cultures and in acute experiments (nerve tissue slices); finally, we will disclose recent in-vivo experiments in which flexible graphene devices are used to record brain activity. The main goal of this talk is to highlight the great potential of graphene technologies in neuroprosthetics and, at the same time, to identify the main challenges ahead.