Synthesis of nitrogen doped graphene derivatives for new renewable nano-structured membranes used for direct alkaline ethanol fuel cell

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Abstract

Fuel cells directly convert chemical energy stored in fuels into electrical energy through electrochemical reactions, and have been identified as one of the most promising technologies for the clean energy industry of the future.

Abalonyx is a partner of an ERA-NET- project entitled **"NanoElMem"** [1]. The overall concept of the *NanoElMem* project relates to developing novel stable and highly effective materials for the direct alkaline ethanol fuel cell (DAEFC), which directly converts ethanol to electric power. The enhancement of the performance of DAEFCs is based on the development of platinum (Pt)-free electrode catalysts and nano-composite membranes by using environmental-friendly inorganic and polysaccharide-based materials and technologies. The enormous technical and scientific potential of graphene will be explored by producing novel graphene-polysaccharide based membranes.

Emphasize will be on Abalonyx activities in producing nitrogen doped graphene oxide (NGO) and reduced graphene oxide (NrGO) (Figure 1). To make the membaranes, the GOs and NGO/NrGOs were dispersed in 1 wt.% chitosan solution (Figure 2). Eventually, the fuel cells equipped with these membranes were assembled and the cell performance was evaluated.
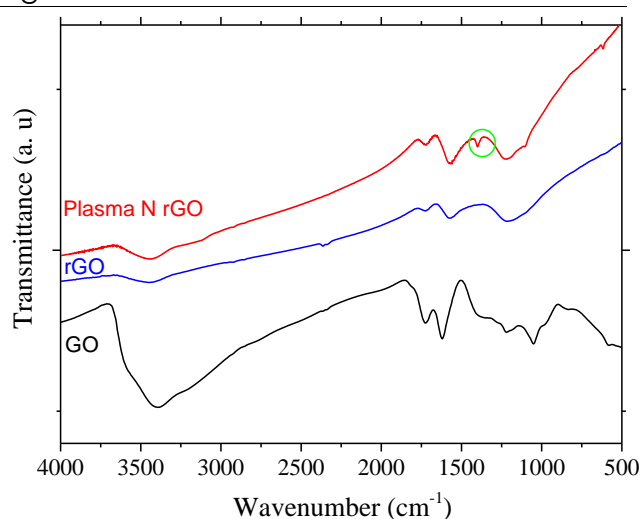
References

[1]   http://nanoelmem.fs.um.si

Figures

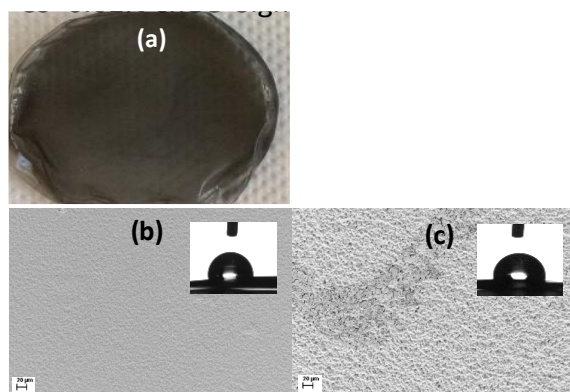**Figure 1:** FTIR spectra of GO, rGO and plasma NrGO

Figure 2: Photograph and SEM images of pristine 1 wt.% of chitosan membrane (b) and chitosan membrane in the presence of GO (a, c)