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Shen, Yang; Yue, Yuanzheng; Boffa, Vittorio

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Nanoporous Reduced-Graphene Oxide for Membrane Application

Yang Shen*¹, Vittorio Boffa¹, Yuanzheng Yue^{1,2}

¹Department of Chemistry and Bioscience, Aalborg University, 9220 Aalborg, Denmark;

²State Key Laboratory of Silicate Materials for Architecture, Wuhan University of Technology, 430070 Wuhan, China

*ysh@bio.aau.dk

Abstract

Because of the unique and outstanding properties, graphene-based materials in water purification is attracting enormous attention as a new technology or to serve as alternative methods for the existing applications. For free-standing membranes, Graphene Oxide (GO) sheets is arguably the most easily scalable approach among the big graphene-based family. Through modifying the functional groups between the GO layers and modulating the order and disorder structure of GO carbon plane, we can control different sizes and valences ions or molecules to go through the GO membrane.

In this study, we fabricate the nanoporous reduced-GO materials for membrane application. By addition of KOH, GO's multilayers will start to produce nanometer or subnanometer pores at high temperature. When the amount of pores reaches a certain number, this process will lead to the special channels formation in GO for water molecules to go through and blocking some big size pollutants. DSC-TGA are carried out to understand the kinetics and chemical mechanisms between GO and KOH. BET and SEM are used in order to characterize the pores' properties.

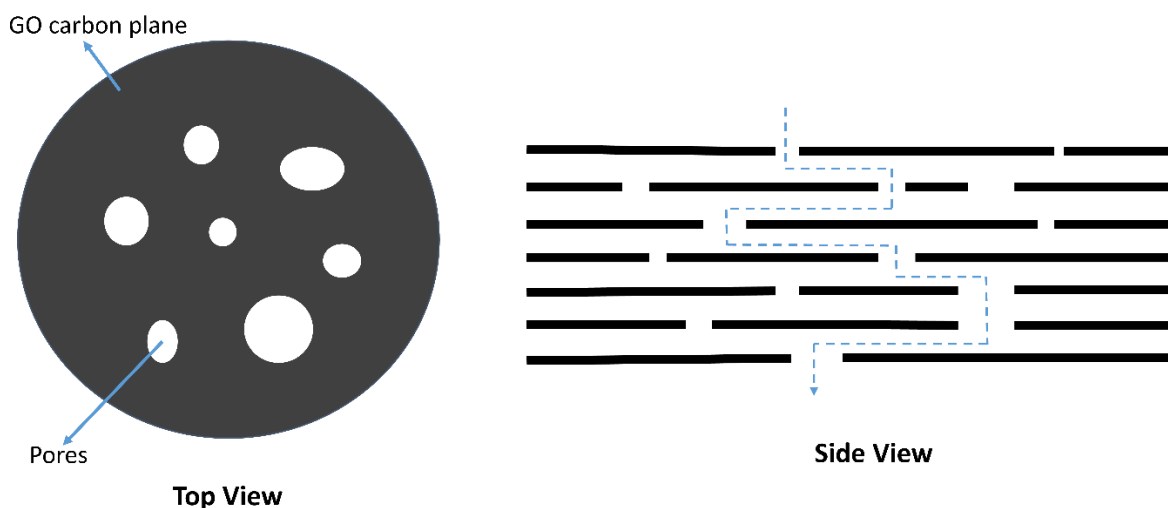


Fig 1. Illustration of water permeating through nanoporous reduced-GO.

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