

## Graphene oxide: The new membrane material

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Membranes for desalination are in strong demand, with the filtration rate being a key issue for membrane performance. Graphene oxide has recently emerged as a new membrane material with excellent filtration properties. It is a compound of carbon, oxygen and hydrogen in variable ratio that mainly depends on synthesis procedure. It can be prepared from graphite by introducing oxygenated functionalities using strong oxidizing agents. These functionalities not only expand the layer separation between two stacked layers but also make the material hydrophilic. I will discuss my recent work on graphene oxide based membranes for filtration.

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## Nanocomposites based on rice straw and silver nanoparticles: Effect of pH and *in vitro* antibacterial activity

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To investigate the influence of pH on the size and distribution of the silver nanoparticles (Ag-NPs) and the antibacterial activity of rice straw/silver nanocomposites (RS/Ag-NCs), Ag-NPs were synthesised on the rice straw (RS) surface with various percentages of Ag-NPs [1.0, 5.0, 10.0 and 20.0 wt.%], under temperature and diverse pH by using urea and sodium hydroxide as stabilizer and reducing agent, respectively. The ultraviolet-visible spectroscopy of synthesised RS/Ag-NCs became noticeable with the increase of pH, the peaks were blue-shifted to lower wavelength. X-ray powder diffraction (PXRD) demonstrated the presence of pure Ag-NPs. Transmission electron microscopy (TEM) showed that the diameter of Ag-NPs on RS were from 7.78 to 2.84 nm at pH 8 to 10. The antibacterial activity of Ag-NPs on RS was examined using gram-negative bacteria (i.e., *Escherichia coli*) and Gram-positive bacteria (i.e., *Staphylococcus aureus*) based on the well diffusion technique at various sizes of Ag-NPs. Higher antibacterial activity was detected as the loading percentage of RS/Ag-NCs increased with the decrease in particle size.

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