



**Wolfson Department of Chemical Engineering Seminar  
Lecture Hall 6, Wolfson Department of Chemical Engineering,  
Wednesday October 31<sup>st</sup> at 1:30pm**

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**Nitrate removal from aqueous solutions by Donnan dialysis**

Nitrate contamination of drinking water supplies is an acute public health concern. Accepted potable water treatment methods for nitrate removal, into concentrated stream, include: anion exchange, reverse osmosis and electrodialysis reversal. Due to the production of high-strength brine residuals, sustainable application of these three technologies is often limited by a lack of local residual disposal options.

Donnan dialysis has a high potential for purifying waters from nitrate contamination due to its simple operation and low energy requirement. In Donnan process the solution of ionic species to be separated is held in a feed compartment separated from a receiver compartment by an ion exchange membrane with a fixed ion charge. The receiver compartment contains a high concentration of stripping counter-ions.

The objective of the research is to develop a comprehensive process for nitrate separation based on Donnan purification of the water, while minimizing high salinity brine disposal. Experiments were carried out to test the effect of the receiver salinity on nitrate removal using Donnan Dialysis. Results revealed that the salinity did not affect the overall removal of nitrate from the feed solution. However, as the salinity decreased, less nitrate was transported to the receiver. It was therefore concluded that some of the nitrate was adsorbed onto the ion exchange membrane. An adsorption model was developed and experimentally verified.

Refreshments will be served at 1:15pm