

## Internship offer for an M.Sc. student in the field of chemical engineering /chemistry

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| <b>Topic:</b>      | Ion-exchange membrane modification for selective removal of Na <sup>+</sup> using electrodialysis   |
| <b>Start date:</b> | From January 2019 on (rather flexible, depending on the availability of the student)  |
| <b>Duration:</b>   | 6-9 months  |
| <b>Location:</b>   | Wetsus, European centre of excellence for sustainable water technology, Leeuwarden<br>( <a href="https://www.wetsus.eu">https://www.wetsus.eu</a> ) |
| <b>Salary:</b>     | 350 euros/month   |

### Background:

This project focusses on the surface modification of a commercially available cation exchange membrane (CEM) with K<sup>+</sup> selective crown ethers. The idea behind this approach is that the K<sup>+</sup> selective crown ether will hinder/block the passage of K<sup>+</sup> but not that of Na<sup>+</sup>, thereby enabling selective Na<sup>+</sup> transport. The modification of CEM involves linking the crown ether to specific functional groups (i.e. -COOH, -NH<sub>2</sub>) at the surface of the CEM. Figure 1 summarizes two proposed possible reaction schemes for CEM modification. The membrane will be implemented in an electrodialysis system.

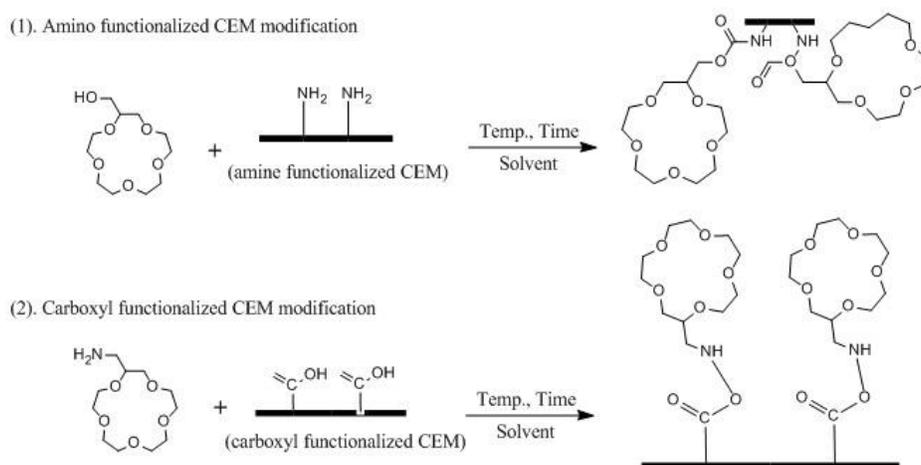


Figure 1. Proposed membrane modification schemes

### Research and Supervision:

Your research includes, first, the chemical modification of the CEM and, second, the functional characterization of the modified membrane using electrodialysis. The research will be conducted at Wetsus in Leeuwarden. Wetsus has state-of-the-art research facilities including a highly motivated and helpful analytical staff. The project will be supervised by Zexin Qian (PhD candidate at TU Delft and Wetsus). The PhD research of Zexin Qian is performed in close collaboration with FujiFilm and WaterFuture, two companies linked to the Wetsus research program.

### Profile wanted:

We are looking for a highly motivated student with a background in either chemical engineering, organic chemistry, or environmental technology. The student should have a sincere interest in doing research and learning to do so. Fluency in English is a prerequisite given the international environment of Wetsus.

### Application:

***If you have any question do not hesitate to contact me.*** Candidates interested in this project are cordially invited to apply by contacting Zexin Qian at [zexin.qian@wetsus.nl](mailto:zexin.qian@wetsus.nl)