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Membrane recovery of MEA-triazine and hydrothermal oxidation of spent H_2S scavengers

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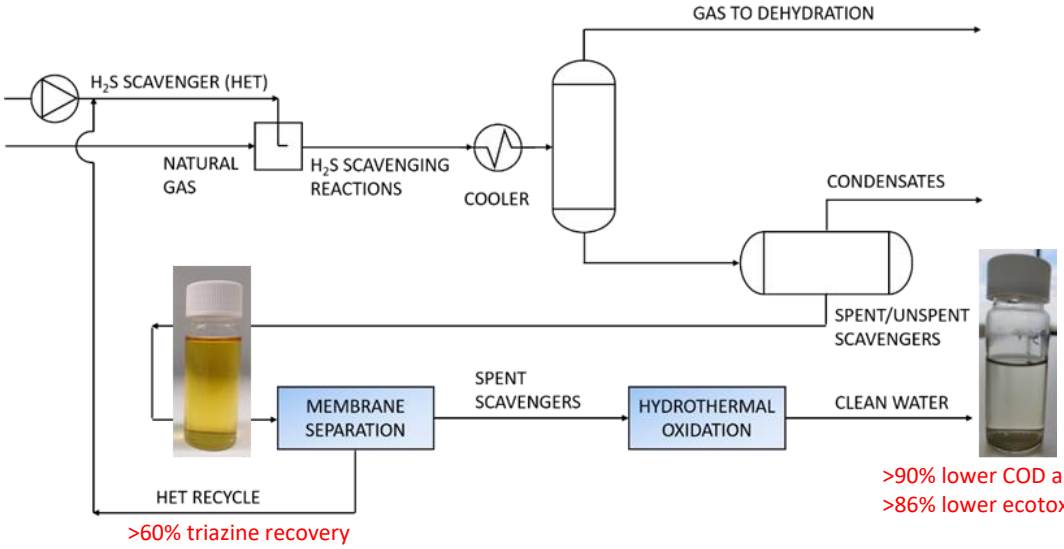
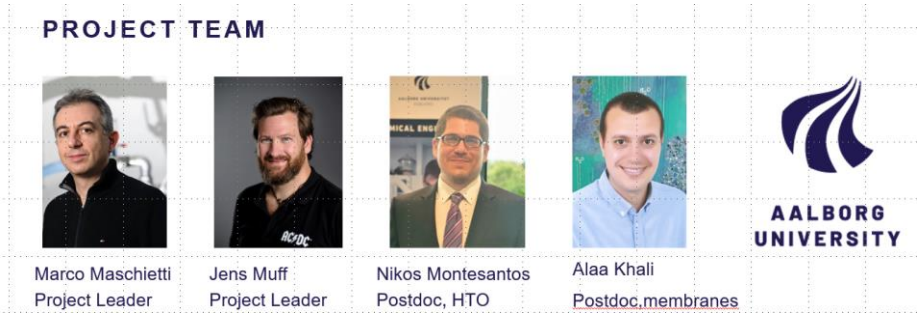
This project aims at: (i) reducing the operating expenses caused by the excessive use of MEA-triazine H_2S scavenger in North Sea offshore oil and gas installations; (ii) reducing the environmental impact of the water discharge of spent and unspent H_2S scavengers. The first target is pursued by membrane recovery of unspent MEA-triazine, while the second target is pursued by subjecting the spent H_2S scavengers to hydrothermal oxidation (HTO).

A tailormade thin-film composite (TFC) membrane was synthesized for the separation of unspent (MEA-triazine) and spent (DTZ) H_2S scavengers from a H_2S scavenging wastewater obtained from an offshore oil and gas installation in the North Sea. The results obtained so far proved that it is possible to separate MEA-triazine, together with monoethanolamine (MEA), from DTZ. For example, at 50% permeate recovery, the rejections for MEA-triazine and MEA are 62% and 82%, respectively, with zero rejection for DTZ.

The HTO process was studied for reaction temperatures in the range 200 to 350°C under excess oxygen. Significant reductions of COD and TOC (up to 98%) were achieved. In addition, the process proved able to reduce the ecotoxicity towards aquatic bacteria of above 90% at all conditions, while the reduction of ecotoxicity towards algae was in the range 48 to 86% depending on the operating conditions.





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