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*Publication date:*  
2023

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Reichert, P., Eftekhari, A. A., Pedersen, K. S., Andersen, S. I., & Sundberg, J. F. (2023). *Metal-organic frameworks (MOFs) as sustainable eco-friendly oxygen scavengers*. Abstract from Danish Offshore Technology Conference 2023 , Kolding, Denmark.

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## Metal-organic frameworks (MOFs) as sustainable eco-friendly oxygen scavengers

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Produced water reinjection is an important tool to reduce the environmental impact of offshore oil production sites by avoiding discharge. To maintain constant flow rates, produced water is mixed with seawater, which contains high levels of dissolved oxygen. Untreated, this leads to well corrosion and bacterial growth.

Metal-organic frameworks are porous coordination polymers that are formed by self-assembly of inorganic nodes, typically metal clusters, and organic linkers. Their permanent porosity greatly facilitates adsorptive processes and rapid mass transfer. Our newly proposed MOFs integrate O<sub>2</sub> binding and will enable selective and reversible binding of dissolved oxygen. With their reusable properties, metal-organic frameworks are incredibly potent to increase eco-efficiency in the oxygen scavenging processes offshore and with that, can reduce the overall environmental impact factor (EIF) of offshore oil and gas production.

The MOF-based sorbent will be incorporated in a dual packed bed reactor setup. One bed is active (1.), while the other is regenerating. Regeneration is achieved by heating deoxygenated water above the critical temperature and passing through the saturated bed (2./3.). An experimental model has been developed to support the design of a pilot and full-scale unit.

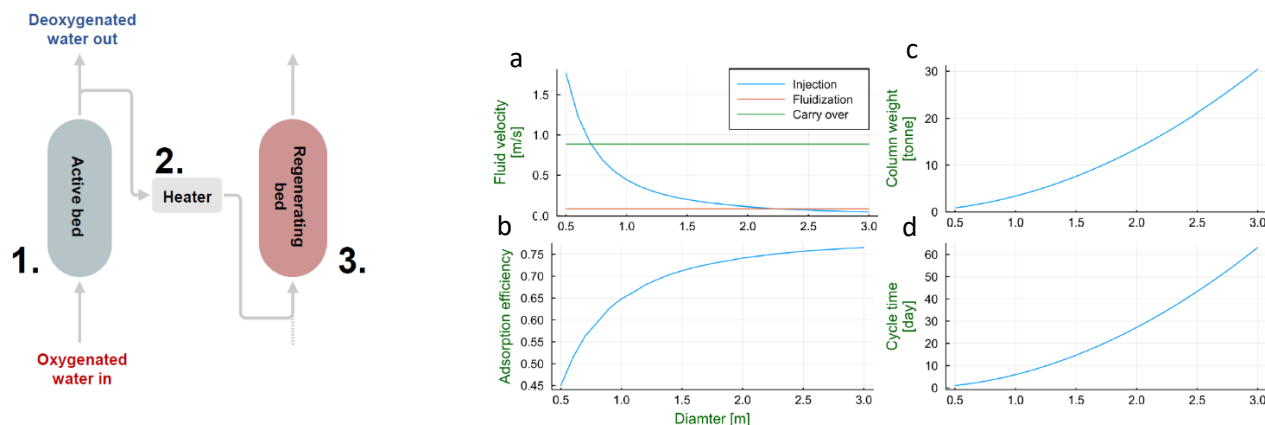


Fig. 1. Left: Dual packed bed reactor setup; right: Computational calculations for an experimental model developed to support the design of a pilot reactor leading to a full scale unit. Diagrams show the development of fluid velocity (a), column weight (b), absorption efficiency (c), cycle time (d) in regard to the diameter of the reactor.

### Acknowledgments

This research has received funding from the Danish Offshore Technology Centre (DTU Offshore).

### References

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