Contribution ID: **144** Type: **Oral Presentation**

Direct Solar Membrane Distillation Device with Micro-3D Printed Spacer and Titanium Mesh

Wednesday, 1 June 2022 11:00 (15 minutes)

Creative and sustainable desalination solutions are needed to meet the world's vast demand for drinking water, one of which is direct solar membrane distillation (DSMD). High-resolution 3D printing can be used to manufacture spacer with complex porous structures, such as triply periodic minimal surface (TPMS), for DSMD. In this work, we propose a hybrid light-absorbing spacer by micro-3D printed assembling TPMS structure with titanium mesh. A direct solar MD setup is developed to monitor the pressure drop, inlet and outlet temperatures and permeate flux and also evaluate the desalination performance. From our experimental results, we find that the TPMS structures have better flow mixing and thus higher permeate flux in comparison with the commercial spacer. The effect of pore sizes of TPMS structures are also evaluated in terms of pressure drop and permeate flux. By incorporating titanium mesh in the DSMD device between the porous spacer and the membrane, the feed water and heat can be localized near the membrane surface for high-efficient water vaporization. This work will provide a new solar desalination solution to relieve the undergoing freshwater stress.

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References

Time Block Preference

Time Block A (09:00-12:00 CET)

Participation

In person

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