2D Material Membranes for Nanofiltration Applications

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2D nanomaterials are becoming more and more popular within academia for applications in separation technology and recently we have seen them begin to transition from the lab into industry. Our company, Molymem Limited, is a University of Manchester spin-out which is commercialising our patented technology based on the 2D nanomaterial molybdenum disulphide (MoS_2). This material is used to form a coating consisting of a laminar structure of these 2D layers on top of porous supporting layers, and allows for an improvement in performance for efficient ionic rejection and nanofiltration applications in the water treatment industry. We can control the rejection and flux through chemical functionalisation of this coating as well as the use of composites of different 2D materials, allowing for a high degree of tunability. In this talk, I will give a technical background of our technology, and put it in context of the progress in the wider academic field on the use of 2D materials for filtration I will discuss some recent case studies which demonstrate the applicability of this technology to tackle real world problems, as well as discuss future directions we may see these 2D materials get adopted in the near future.

References

[1] ACS Nano 2017, 11, 11, 11082–11090
[2] 2D Materials, 2020, 7, 015030
[3] Patent US (10913035)

Figures

Figure 1: Photograph showing an MoS_2 coated ceramic tubular membrane (Left). Photograph showing pilot scale testing facility using Molymem membranes. (Right)