Contribution ID: **752** Type: **Poster (+) Presentation**

Surface-washing of contaminated porous substrates

Thursday, 3 June 2021 20:00 (1 hour)

We present surface-washing experiments modelling the decontamination of porous substrates.
Firstly, we report a protocol to manufacture well-defined porous media by sintering glass ballotini (< 1 mm) to form free-standing homogeneous porous plates or incorporating a non-porous solid glass backing and/or surrounding: the resultant samples are mechanically stable cuboids. The ability to incorporate directly a solid glass backing provides a method of preventing any liquid leaks through their lower surface. These bespoke porous media are then integrated into an apparatus used in a previous work which studied surface-washing decontamination of impermeable surfaces (Landel et al. 2016).
Before the start of the experiment, a dyed fluid is introduced to the porous substrate to simulate the region of contamination. The surface-washing is simulated by a thin (~1 mm) film of water flowing from a reservoir through a gap over an inclined porous-glass surface. The resulting interaction between the cleansing film flow and the contaminating dye is then tracked using dye attenuation, enabling us to analyse the contaminant field in space and time.
A novel feature of these experiments is our use of bespoke porous media sintered from glass ballotini to form either free-standing homogeneous porous plates or composite structures where a porous matrix is sintered onto a solid glass backing with (optionally) solid glass surrounds.
We report results for a range of scenarios, assessing the role of initial conditions and cleaning strategies, demonstrating the possibility of the decontamination process leading to a redistribution of the contaminant within the porous medium.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

Landel, J., Thomas, A., McEvoy, H., Dalziel, S.: Convective mass transfer from a submerged drop in a thin falling film. J.Fluid Mech. 789, 630–668 (2016)

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Track Classification: (MS6-A) Physics of multi-phase flow in diverse porous media