

# Sponge structure key to mopping up oil spills

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An interconnected structure, which water can easily flow through, is key to creating a highly effective mechanical sponge for clearing oil spills.

These are the findings from scientists at the Istituto Italiano di Tecnologia (IIT), Italy, in their paper published today, 2nd March 2016, in the *Journal of Physics D: Applied Physics*.

The traditional method of clearing an oil spill, containing it with the use of booms and then 'sucking' the oil from the surface of the water, looks set to be replaced with polyurethane foams that can sponge the oil directly out of the water.

"We wanted to understand what the key features of such foams are, and how they can affect their performance" explains Dr Javier Pinto, author of the paper. "Particularly whether it was necessary to modify the surface chemistry, or if you could reach really good performance by simply choosing foams with the right structural parameters."

The experimental and theoretical study shows that with highly interconnected open porous structures, and pore sizes below 500 micrometres, it is possible to reach absorption capacities as high as 30 grams of oil per gram of polyurethane.

Chemical functionalization of the porous structure did not appear to enhance the oil absorption efficiency, but did significantly contribute to the selectivity of the process.

"It came as a surprise that there is an absence of considerations of the structure or even characterization of the foams employed in several previous studies" continues Pinto. "Understanding this is key to evaluating proposed treatments and coatings, and their effectiveness."

Dr Pinto believes that due to the simplicity of the polyurethane foam they propose, commercialisation of the materials for [oil](#) spill remediation could happen very soon.

"Our next steps are to develop composite materials for wider water remediation" concludes Pinto. "These could be low environmental impact - using materials derived from waste - and have biodegradable or biocompatible properties."

"We'll explore the use of these systems not only for clearing [oil spills](#), but also other contaminants such as heavy metals or pesticides."

**More information:** Javier Pinto et al. Effect of the porous structure of polymer foams on the remediation of oil spills, *Journal of Physics D: Applied Physics* (2016). [DOI: 10.1088/0022-3727/49/14/145601](https://doi.org/10.1088/0022-3727/49/14/145601)

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