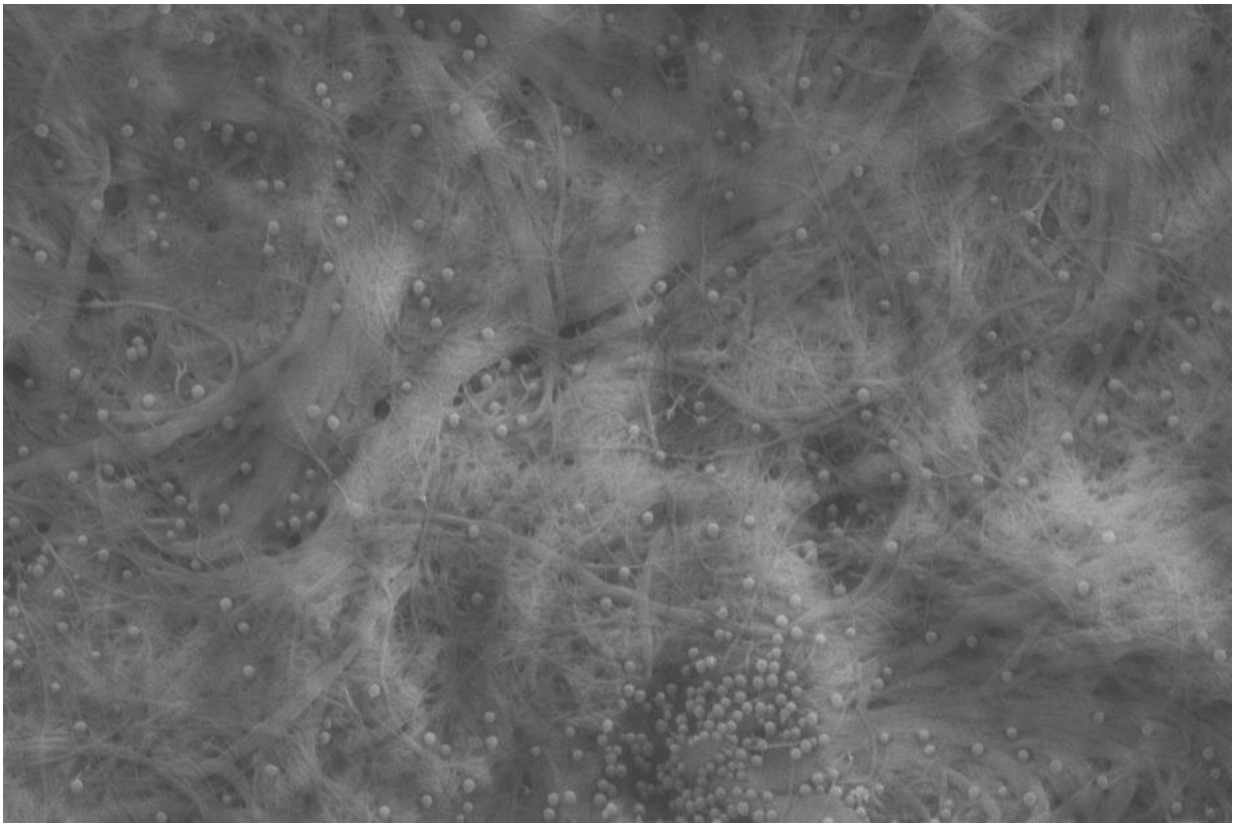


New solution to capture microplastics before they enter waterways

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A scanning electron microscope shows how the microplastic particles are attached to the nanocellulose structure. The diameter of the plastic particles is 100 nanometers. Credit: VTT Technical Research Centre of Finland

A thousand liters of seawater can contain up to 8.3 million particles of

microplastics. Until now, identifying these very small particles has been difficult—usually they are only detected once they have accumulated in the bodies of fish. A method developed at VTT utilizes nanocellulose structures for early particle identification. Nanocellulose would allow particles to be captured even before they enter waterways.

The properties of nanocellulose films and hydrogels support the identification and capture of very small [microplastic](#) particles.

"Nanocellulose has a mesh-like, [porous structure](#) and a large BET surface area. In the water, powerful capillary forces are generated in this structure, allowing particles to be transported inside the mesh and bound there," says Research Professor Tekla Tammelin from VTT.

The method provides a way to catch microplastic particles of a size that the human eye cannot detect. These are particles with a diameter of only 100 nanometers.

"Nanocellulose structures can be used to identify and analyze these particles and to obtain information about their behavior at an earlier stage. We can determine the concentration of particles in water and analyze, for example, whether particles are released into drinking [water](#) from plastic bottles."

Next step: filtration methods

The identification of microplastic particles with [nanocellulose](#) structures has been developed at VTT as part of the FinnCERES flagship project, which is exploring new bio-based material solutions. The next step could be to develop new and inexpensive filtration solutions utilizing the method.

"New filtration solutions would allow particles to be captured where they

are generated. The solutions could be utilized, for example, in laundry, where microplastic particles are released from fleece clothing and other synthetic fibers. Similarly, we could develop filtration methods for any industry where there is a risk of microplastics being generated and released into waterways."

Provided by VTT Technical Research Centre of Finland

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