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Shrinking the size and cost of air pollution detectors **FREE**

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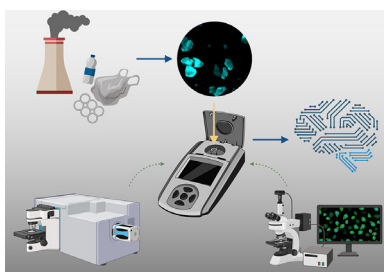


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Shrinking the size and cost of air pollution detectors

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Examining the principles and methods of detecting micro- and nanoplastics using handheld devices.



There is a growing concern about the effects of exposure to micro- and nanoplastics (MNPs), small plastic particles found in our air, our water, and in our own bodies. Scientists have developed ways to detect MNP, but airborne MNP detection methods still depend on expensive laboratory instruments.

Thomas et al. discussed the current analytic approaches used to identify MNP, comparing them with particulate matter (PM) detection, smartphone-based imaging, and handheld spectroscopy. Using this comparison, the team suggested a portable MNP detection method as an alternative to traditional methods.

“MNP detection has recently become much more important, while their detection methods are still based on laboratory instruments,” author Chloe Thomas said. “We hope to provide a proper path for a low-cost, easy-to-use, handheld MNP detection device that can be used in the field. We looked into what detection principles should be incorporated in such a handheld device, using the advancements made for PM detection, smartphone imaging, and handheld spectroscopy.”

“Methods and principles they described should be designed, built into, and tested in actual handheld MNP detection devices, since these devices are feasible but their capabilities have not been sufficiently demonstrated,” author Un Hyuk Kim said.

For example, author Jeong-Yeol Yoon said, a smartphone-based imaging device can replace a bulky microscope.

In addition, “machine learning methods with numerous learning data sets should be utilized for these detection methods to improve the accuracy and specificity of MNP detection,” Yoon added.

The authors hope their analysis will aid optical scientists and engineers interested in handheld microscopic imaging and spectroscopic analysis, along with environmental scientists and engineers interested in MNP pollution, detection, and remediation.

Source: “A comparison of current analytical methods for detecting particulate matter and micro/nanoplastics,” by Chloe Thomas, Togzhan Spatayeva, Dawon Yu, Andrew Loh, Un Hyuk Yim, and Jeong-Yeol Yoon, *Applied Physics Reviews* (2024). The article can be accessed at <https://doi.org/10.1063/5.0153106>.

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