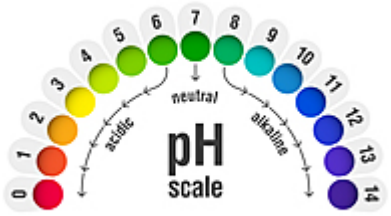
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Facile Colorimetric Detection of Ambient Aerosol pH

TECHNOLOGY NUMBER: 2018-466



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Category
Energy, Infrastructure and Environment
Engineering & Physical Sciences

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OVERVIEW

Portable Instrument for Monitoring of Aerosol Acidity

- Facile Colorimetric Detection of Ambient Aerosol pH
- A mechanism that is rapid, affordable, easy to use, and portable

BACKGROUND

Air pollution, specifically aerosols, is a major contributor to climate change and a detriment to overall human health. Detecting ambient aerosols, which are tiny solid or liquid particles suspended in the air, involves various scientific methods and instruments. Aerosol acidity levels are vitally important for understanding atmospheric aerosol dynamics and secondary organic aerosol (SOA) formation, but the ability to monitor changes in acidity has remained largely elusive. Current technologies rely on modeling, estimation, or expensive instrumentation. As such, there is a significant unmet need for an affordable, accurate method for direct detection of atmospheric aerosol pH levels.

INNOVATION

Researchers at the University of Michigan have developed a technology that accurately monitors the pH of aerosols using relatively simple and common laboratory equipment. Using an impactor, relative humidity control, pH strips, a cell phone camera and simple image analysis software, users are able to gather accurate pH data on aerosols. No cumbersome filters or UV-Vis spectrometers are required. As such, this technique represents a significant departure from current methods and is fast, affordable, easy-to-use, and portable. Importantly, this system is amenable to a small box form factor for simplified use, remote operation in the field, and even

automated monitoring (potentially as part of an IoT network). This technology will be of value to those with a desire to understand aerosol formation and acidity from a scientific, regulatory, and environmental monitoring perspective.