

## **SCAVENGING NANOPARTICLES USING A COMBINATION OF FOG DROPS AND CYCLONE SEPARATION**

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Particles of all sizes and compositions can be found in the atmosphere. Some engineered particles are useful to humans, however, some have a noxious effect on human health. Inhalation of such toxic particles can result in various pulmonary and cardiovascular diseases. The particles that exist in diesel exhaust are referred to as diesel particulate matter (DPM). These particles are nanometer in scale and have been declared carcinogenic by the International Agency for Research on Cancer (IARC). Due to the extensive use of diesel engines, DPM has become a significant health threat. Though various scavenging technologies exist for the micron-scale particles, a highly efficient and economical method for nanoparticle scavenging has yet to be developed. Brownian motion can be used to collect nanoparticles from a particle-laden stream, by allowing nanoparticles to diffuse toward micron scale fog drops. Once combined with the relatively large fog drops these drops can be removed using inertia based methods, taking the nanoparticles with them. A cyclone separator can be used for this purpose and provides a very robust approach to this task since it has no moving parts. Our research explores this new method for scavenging nanoparticles from a flow using fog drops and cyclone separator. We have demonstrated the feasibility of this method and have shown high scavenging of nanoparticles.

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