

1.023 Development of a small-sized cyclone to collect ultrafine particles in the air.

Early Career Scientist

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Abstract:

Fine particles in the air is serious concern for human health such as cancer, lung damage and respiratory disease. However detailed mechanism of the cellular biochemical reactions associated with the toxicity of fine particles have not been revealed well so far. Generally, cell exposure studies for aerosol particles been conducted using particulate matter collected by vibrating aerosol-loaded filters. However, the particles used for the exposure study may not be the same as those present in ambient air because contamination from the filter material may be included. Therefore we developed an instrument that collects fine particles in the air without using filter. It consists of an impactor and a cyclone. Fine particles in the air would be collected with cyclone. However this method also has a problem that cyclone cannot collect ultrafine particles. The 50% cut off diameter of the particles was about 0.3 μm though there were much quantity of particles smaller than 0.3 μm in the air. We would like to collect particles smaller than 0.3 μm . Therefore we prepared a small-sized cyclone. If the size of the cyclone diameter becomes smaller, the centrifugal force to the particles in the cyclone would be larger. As a result, the small-sized cyclone showed much better separation characteristics than the initial one.