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Filtration Solutions for Sustainable Environment

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We are developing filtration technologies to benefit sustainable environment, which will enable people and the environment to prosper together. The Center for Filtration Research (CFR) at the University of Minnesota, collaborating with 20 leading international filtration manufacturers and end users, was established to find filtration solutions to mitigate $PM_{2.5}$ and other environmental pollutants. CFR investigators perform fundamental and applied research on air, gas and liquid filtration. There are more than 15 on-going research projects performed at CFR. I will select 6 projects to demonstrate the scope of the research topics: 1. Reduction of aerosol concentration in classrooms under various HVAC conditions to prevent virus transmissions; 2. Filtration performance improvement using beaded nanofiber; 3. Fiber shedding investigations using a pulsed air system; 4. Ozone removal from aircraft environment using Zeolites; 5. Development of a microsensor for detecting particles in bulk liquids and aerosols, and for bioaerosols; 6. Temperature resistant nano-scale membrane for enhanced ceramic wall-flow filter performance.

Large scale air cleaning towers were established in Xi'an and Yancheng in China, and two additional towers are built and operated in Delhi, India. They are developed to mitigate $PM_{2.5}$ pollutants in urban air. The second-generation tower in Yancheng is developed to reduce not only the $PM_{2.5}$ but also CO_2 in the atmosphere. An integrative and collaborative approach, among academia, governments, and industries, can effectively manage and create a sustainable global environment.