

## Nanofiber based filter media for Catalyst Applications and Particulate Capture

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The abatement of nitrogen oxides (NO,NO<sub>2</sub>) and carbon monoxide caused by automotive and industrial exhausts is a topic of great research and development. These gases are potential health hazards and green house gases. Noble metal oxide nanofibers are potential candidates as catalysts for such heterogeneous catalytic reactions. These nanofibers have special electronic and morphological properties as well as high surface energy which result in their unique catalytic activity/selectivity. The noble metals (palladium, platinum and rhodium) have been incorporated into alumina nanofiber support by sol gel processing and electrospinning techniques. The diameters of the nanofibers and nanoparticles were in the range of 60-100nm and 2-7nm, respectively. These nanofibers have been incorporated into alumina microfibrinous filter media by the vacuum molding technique. This filter media is successfully able to convert NO to N<sub>2</sub> and CO to CO<sub>2</sub>. These filters also serve as particulate filters and separate particles from the air stream on the basis of size, shape and charge of the particles with respect to the properties of the filter medium. Tests from TSI 8130 would give us the capture efficiency and the pressure drop across the filter media. The total efficiency of the filter media would include the collective efficiency from individual mechanisms such as direct interception, inertial impaction, Brownian diffusion and gravity settling. Hence, this filter media would include advantages such as light weight structure, optimization of precious metals, high capture efficiency, high surface area, highly interconnected network of pores and high permeability.

### Bio Sketch

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Research:

1. Metal Oxide Nanofiber filters as Catalyst and Catalyst Supports
2. Localized wound healing using electromagnetic induction heated nanofibers
3. Nanofiber yarns for biomedical applications
4. Ceramic nanofibers for space applications