



## Preparation of Single Layer Nonwoven Fabric Treated With Chitosan Nanoparticles and Its Utilization in Gas Filtration

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**Abstract:** The rapid industrialization has resulted in increasing pollution levels and leads to serious health problems and environmental hazards. Textile filters are widely used in filtration purposes to eliminate pollution negative impacts on air quality and to improve hygiene at work places. In this context, gas filtration behaviour of four types of spunlaced nonwoven fabrics produced from polyester fibers, viscose fibers and their blends were investigated. The nonwoven samples were treated with Chitosan Nanoparticles (CSNP's) to enhance filtration properties. The characteristics of nonwoven samples such as thickness, mass per unit area, air permeability, and bursting strength have been studied to evaluate their performance. In addition to, FTIR analysis and surface morphology using TEM and SEM. The filtration efficiency of the nonwovens towards harmful gases like (CO, CO<sub>2</sub>, and SO<sub>2</sub>) was determined. The results demonstrated that, treating nonwoven samples with Chitosan NP's had increased their filtration efficiency through adsorbing the harmful gases. Also, the 100% polyester filter sample is more appropriate for gases filtration applications and achieved its best functional performance gathering the physical and mechanical properties when it is treated with 1.5% CSNP's.

**Key words:** Air pollution, Gas filtration efficiency, Spunlaced nonwoven, Chitosan, Air permeability, Bursting strength.

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