

Particle Loading on the Composite of Meltblown Electrets with Electrospun Webs and with Microporous Membranes as Air Filter Media

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Extended Abstract

Meltblown (MB) electrets, electrospun (ES) nanofiber webs, and microporous membranes are widely used as filter media for high FE applications. Among them, MB electrets have a lower FE but lowest DP. ES nanofiber webs have both medium FE and DP. Microporous membranes have both the highest FE and DP. MB electrets take the advantage to attract small particles moving at a slow speed by the electrostatic attraction force which overcomes the aerodynamic convection force of the particles. The nanofibers in the ES webs have higher capability to attract nanoparticles by Brownian diffusion in mechanical mechanisms. However, larger particles in the aerosol cake on the surface of both the ES webs and the microporous membranes. A large amount of microparticles are blocked by the microchannels in the ES webs. Most nanoparticles are attracted on the surface of the nanofibers or blocked inside the microchannels of the microporous membranes. Therefore, the DP increases sharply with the loading of particles in ES webs and in microporous membranes. The use of MB electrets as a prefilter on an ES web or on a microporous membrane tremendously decreases the increasing rate of the DP by both the NaCl and the oily particle loading, and also decreases the increasing rate of penetration when challenged with the oily particles. This loading phenomena on the composite of MB electrets with ES webs and with microporous membranes, respectively, will be discussed and addressed in the presentation.

For oral Presentation, Presenter – **Peter P. Tsai**