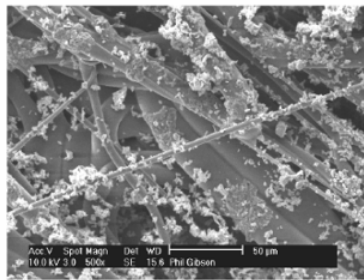
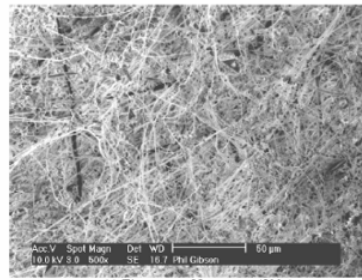


Nanofiber Filtration of Lunar Dust Simulant

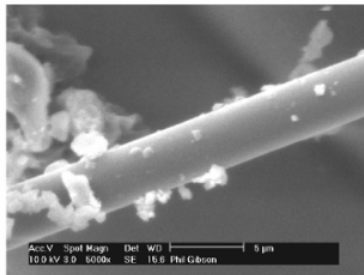
The U.S. Army Natick Research, Development, and Engineering Center, in cooperation with the Colorado School of Mines, and with the funding from NASA and the assistance of the National Protection Center, published a study in 2008 of the effectiveness of nanofiber filtration media against simulated lunar dust. Dust filtration in spacecraft environments is a critical issue in the planned return to the moon, where lunar dust would likely be brought back into the lander environment by astronauts, and on possible future manned trips to dusty planetary environments such as Mars. In this research, filtration testing using simulated lunar dust determined the comparative filtration efficiency of various nonwoven filtration media. Nanofiber witness media, combined with scanning electron microscope images, showed that an electrospun nonwoven filter layer effectively filtered out all the large and fine particles of the simulated lunar dust. The research concluded that nanofibers incorporated as separate filtration layers in multilayer filtration stacks, or incorporated as intimate blends into more traditional filtration media, should be highly efficient at filtering out the fine particles present in lunar soils.



(a) Meltblown Nonwoven (500x)



(a) Electrospun Nonwoven (500x)



(b) Meltblown Nonwoven (5000x)

Scanning electron microscope images of meltblown nonwovens sample exposed to lunar dust simulant JSC1a-vf (very fine dust <20 microns).



(b) Electrospun Nonwoven (5000x)

Scanning electron microscope images of electrospun nonwovens samples exposed to lunar dust simulant JSC1a-vf (very fine dust <20 microns).

Reference/Publication

Effect of Nanofibers on Spore Penetration and Lunar Dust Filtration, *Journal of Engineered Fibers and Fabrics* 3 (2), pp. 19-28, 2008.

Contributing Agency: DoD / RDECOM