

## **Two-dimensional Modeling of Nanoparticle Collection Efficiency in Bimodal Filters**

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### **Abstract**

In this work, a series of 2-D numerical simulations are formulated to study the collection efficiency of bimodal filters when challenged with nanoparticles ( $d_p < 100$  nm). Our simulation results are used in establishing a unimodal equivalent diameter for the bimodal media thereby taking advantage of the existing expressions of unimodal filters for capture efficiency prediction in the entire range of mass (number) fractions,  $0 \leq n_c \leq 1$ , with fiber diameter ratios  $1 \leq R_{cf} \leq 7$ , and solidities of 5 to 15 percent. We also discuss the influence of  $R_{cf}$  and  $n_c$  on the filters' quality factor when challenged with nanoparticles.

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