

CHARACTERIZATION OF DUST LAYER FORMED ON THIN INORGANIC POROUS MEDIA**Y.M. Jo, S.H. Lee, J.M. Oh***Department of Environmental Science & Engineering, Kyung Hee University, Yongin-City, South Korea*

In the separation of airborne dust by using porous filter media, the structure of dust layer instantaneously formed on the filter surface during the filtration directly affects the effective filtration performance by acting as another fixed porous medium. The present study has investigated specific resistance (K_2') of the dust layer and its porosity (ϵ_c) for three different inorganic filter media; a fly ash composite filter, a metal fiber filter and a stainless filter. In the regime of laminar flow, the structure of dust fixed layer was verified by estimation of the cake porosity based on a modified Kozeny-Carman equation. The specific resistance (K_2') increased proportionally with the increase of filtration velocity, while the cake porosity (ϵ_c) decreased, possibly due to the compressible effect of dust layer. In addition, subsequent dust particles would block the open channels across the layer and thereby result in a high specific resistance of the layer. The most porous metal fiber filter showed the least resistance, which ascertained that the structure of filter medium might influence dust deposition. The feed dust loading resulted in an adverse effect; low dust loading formed more dense cake structure. As a result of the estimation of apparent porosity (ϵ_b), it was found that the apparent porosity was appeared more or less excessive because the potential deposition mechanism occurred while filtering would not be regarded. In accordance, it is more reasonable to estimate the specific resistance for the prediction of cake structure in solid dust filtration.