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## **Soot trapping both in the wall and on the surface of diesel particulate filters: Effect of particles size distributions and material properties**

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**W**all-flow diesel particulate filters are widely used for soot removal from engine exhausts. The exhaust gas flows through the porous walls from the inlet channel into the outlet ones. Soot particulates deposit both in the pores of the wall and on its surface in the inlet channels. The efficiency of the further oxidation of accumulated soot depends on the ratio of soot captured inside the wall to one collected on the wall surface because soot inside the pores has more close contact with catalyst. In theoretical investigations devoted to soot capturing in diesel particulate filters, authors usually take into account soot trapping either inside the porous material of filters or on the wall surface. Besides, they assume a constant particulates size in mathematical models. The paper is devoted to the development of the unsteady-state mathematical model, which takes into account the simultaneous soot accumulation both inside the wall and on its surface. We assume that the soot deposit in the pores by inertial impaction, interception, Brownian diffusion and interactions between interception and Brownian diffusion. We allow for soot collection on the wall surface firstly by inertial impaction, after the soot amount on the surface exceeds a critical level, the pores are bridged by soot and all soot deposits on the surface. We consider also particulates size distributions in the model. The accumulation of soot in the wall and on its surface increases the flow resistance. We present the results of the study of the effect of particles size distribution and material properties on the filtration efficiency and pressure drop.

### **Biography**

N V Vernikovskaya is a Researcher at BIC SB RAS and an Associate Professor at the NSTU. She has completed her PhD in 1996. She has published more than 30 papers in reputed journals.

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