

## PARTICULATE MATTER CONTROL IN ENGINE EXHAUST USING ACTIVATED CARBON FIBER

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### Abstract

This study is aimed at investigating the potential application of chemically treated, metal impregnated activated carbon fiber (ACF) in the control of PM emissions from engine exhaust. Phenolic resin and viscose rayon precursors based ACFs were used in this study. In order to change the surface polarity of ACF it was treated with suitable chemical ( $H_2O_2$ ); subsequently the sample was impregnated under flow conditions with the salts of Ni and Ag in aqueous solution and then calcined to convert impregnated salts to their oxides states. Finally, reduction of the metal oxides was carried out by hydrogen. Thus prepared metal impregnated surface polarized ACF samples were tested for the removal of PM by simultaneous adsorption and combustion of PM in a tubular reactor placed at the downstream of engine turbocharger, the combustion was carried out using a heating element which was in direct contact with reactor. The exhaust PM concentration was measured by the Engine Exhaust Particle Size (EEPS) analyzer under varying load conditions. The operating parameters were as follows, combustion was carried out at  $500^{\circ}C$ , metal types (Ni and Ag), exhaust flow rate (5-10 slpm), engine load (100%, 75% & 50%). The preliminary results obtained so far suggest significant decrease in PM concentration under these experimental conditions. We will present the new data along with the complete adsorption mechanism and reaction kinetics in reactor.

**Key words:** Activated carbon fiber (ACF), Particulate Matter (PM), Adsorption, Impregnation, kinetics.

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