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## A study of improving filtration efficiency through SiC whisker synthesis on carbon felt by CVD VS method

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Mankind is enjoying a great convenience of their life by the rapid growth of secondary industry since the Industrial Revolution and it is possible due to the invention of huge power such as engine.

The automobile which plays the important role of industrial development and human movement is powered by the Engine Module, and especially Diesel engine is widely used because of mechanical durability and energy efficiency. The main work mechanism of the Diesel engine is composed of inhalation of the organic material (coal, oil, etc.), combustion, explosion and exhaust Cycle process then the carbon compound emissions during the last exhaust process are essential which is known as the major causes of air pollution issues in recent years. In particular, CO<sub>x</sub>, called carbon oxide compound which is composed of a very small size of the particles from several ten to hundred nano meter and they exist as a suspension in the atmosphere. These Diesel particles can be accumulated at the respiratory organs and cause many serious diseases.

In order to compensate for the weak point of such a Diesel Engine, the DPF(Diesel Particulate Filter) post-cleaning equipment has been used and it mainly consists of ceramic materials(SiC, Cordierite etc) because of the necessity for the engine system durability on the exposure of high temperature, high pressure and chemical harsh environmental. Ceramic Material filter, but it remains a lot of problems yet, such as limitations of collecting very small particles below micro size, high cost due to difficulties of manufacturing process and low fuel consumption efficiency due to back pressure increase by the small pore structure.

This study is to test the possibility of new structure by direct infiltration of SiC Whisker on Carbon felt as the next generation filter and this new filter is expected to improve the above various problems of the Ceramic DPF currently in use and reduction of the cost simultaneously.

In this experiment, non-catalytic VS CVD (Vapor-Solid Chemical Vaporized Deposition) system was adopted to keep high mechanical properties of SiC and MTS (Methyl-Trichloro-Silane) gas used as source and H<sub>2</sub> gas used as dilute gas. From this, the suitable whisker growth for high performance filter was observed depending on each deposition conditions change (input gas ratio, temperature, mass flow rate etc.).

**Keywords:** SiC, Whisker, Filter