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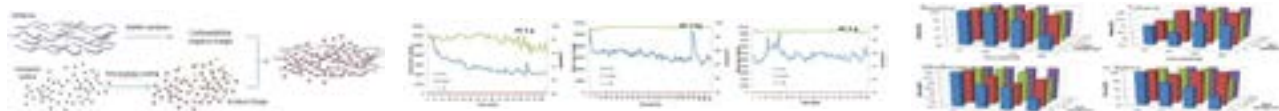
SEPARATION TECHNIQUES

October 23-25, 2017 | Paris, France

Fine dust and BTEX removal using hanji cellulose filter impregnated with powdered activated carbon

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Micro-porous cellulose filters were fabricated from paper mulberry pulp, which has been used for thousands of years with Korean history. 'Han-ji' is the name of a traditional paper used widely in Korea in construction, textile, craftworks and many household items but before now it has not been used for filtration purpose. To remove a fine dust and volatile organics, the porous cellulose fiber filters impregnated with powdered activated carbon were prepared as follows. Firstly, to convert the hydrogen bond of cellulose into carboxylation the TEMPO (2,2,6,6-tetramethylpiperidine-1-oxyl) was used as catalyst in NaHClO solution. Secondly, to give a positive charge on the surface of powdered activated carbon (A/C) the Poly-immine was used as a chemical compound containing a carbon-nitrogen double bond. The mixtures of the carboxylic Hanji cellulose and the positive charged A/C was blended to the ratios of 1 to 1 in 1 L of water and added t-BtOH as sublimation agent to the mixtures. After being carried out vacuum filtration and freezing dry, the final ones were prepared for triple layered filter impregnated with activated carbon. The tests on fine dust and BTEX removals were performed with continuous feeding type filter, influent flow rate 100 m³/min. The removal efficiencies of them were up to 99 %, respectively, while the linear velocity of filter was operated to the range of 1 m/sec – 2 m/sec.



Synthesis of A/C impregnated cellulose and their fine dust and VOC removals

Biography

Kwangsoo Kim has his expertise in advanced nutrient removal and environmental materials of environmental engineering. His invented Biological Nutrient Removal processes namely, P/L process and CF SBR have been put to practical use at about 200 sites in Korea. Recently, his research was focused on environmental materials specialized in a fine dust and VOC removal technology. The development of activated carbon coated Electrodes, which can do without corona discharge in electrostatic-precipitator, to remove dust and VOC are very creative and the Hanji cellulose filter gave a new concept how to prepare for porous filter from natural cellulose.

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