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## VOC DECOMPOSITION IN AIRFLOW BY PULSED DISCHARGE

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### Abstract

The flow field effect on the decomposition of a volatile organic compound induced by plasma or plasma-catalytic system is investigated by using a new developed ejection wire-cylinder reactor generating pulsed corona plasma. Toluene is chosen as the test contamination and nano-TiO<sub>2</sub> film is chosen as the photocatalyst. The flow field affects the toluene decomposition induced by either single plasma or combination of plasma with catalyst, and it also affects the development of purification capability. Without catalyst, the difference of decomposition efficiency resulting from different flow field is 14.4% at voltage of 34kV, while with catalyst, it approaches to 15.6% at voltage of 30kV. The time to reach maximum purification capability under ejection condition is longer than that under circumfluence condition, but the purification capability under ejection condition is stronger. The synergy of plasma and catalyst on toluene decomposition is obviously, and the decomposition efficiency is as high as 94.74% when the inlet toluene concentration increases to 400 ppm. With catalyst, the decomposition efficiencies with positive pulse and with larger electrical capacitance are obviously higher than that with negative pulse and with smaller electrical capacitance, respectively. And the differences all increase with the increase of voltage.

*Key words:* air purification, corona plasma, flow field, photocatalyst, toluene

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