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UV/H_2O_2: An efficient aqueous advanced oxidation process for VOCs removal

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Abstract: Catalyst deactivation and secondary pollution are the critical issues challenging the traditional heterogeneous catalysis (gas-solid) methods for VOCs removal at room temperature. This process strongly depends on the available ·OH radicals. Because of the facile formation of ·OH radicals, H_2O_2-based advanced oxidation processes (AOPs) may facilitate VOCs removal. In this paper, UV/H_2O_2, for the first time, was employed to degrade continuous-flow gaseous toluene in batch system with comparison to UV/Fenton and Fenton process. UV/H_2O_2 process was identified to moderately generate ·OH radicals and yielded removal efficiency higher than 80% without any loss while it gradually declined to 32% and 45% within 120 min in the Fenton and UV/Fenton process, respectively. No emission of gaseous intermediates was identified at the outlet in all the AOPs. Most of the removed toluene was oxidized into CO_2 in the UV/H_2O_2 process, however, many organic intermediates were generated in the solution of Fenton and UV/Fenton process. The superior performance of UV/H_2O_2 process was mainly ascribed to the continuous

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