

Oxidation of toluene by pulsed corona discharge combined with photocatalysis as a post-treatment for gaseous exhaust

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Toluene oxidation by pulsed corona discharge (PCD) in combination with photocatalysis implemented as a post treatment method of gaseous exhaust was studied. The increase of toluene initial concentration predictably demonstrated slower PCD-oxidation in water, while the opposite outcome was observed in gas-phase resulting in more prompt toluene abatement. Ozone generation in electric discharge was also monitored indicating continuous increase of its gas-phase concentration up to 200 ppm. Changes in pH did not influence the treatment process, whereas the increase in temperature appeared to reduce the energy efficiency. Residual toluene and ozone in gaseous exhaust originating from PCD setup were successfully degraded in a multi-section photocatalytic reactor with adjustable catalytic surface of P25 TiO₂. In addition to water vapour and carbon dioxide, carbon monoxide was also monitored as degradation product.

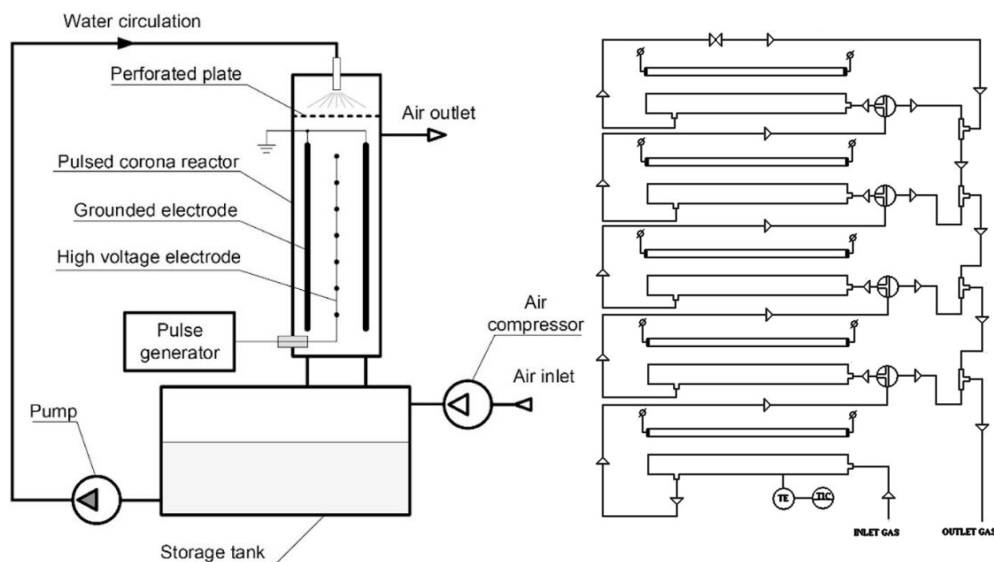


Figure 1: Schematic illustrations of PCD and photocatalytic reactor.