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Article

Heterogeneous Catalytic Ozonation of Aniline-Contaminated Waters: A Three-Phase Modelling Approach Using TiO_2/GAC

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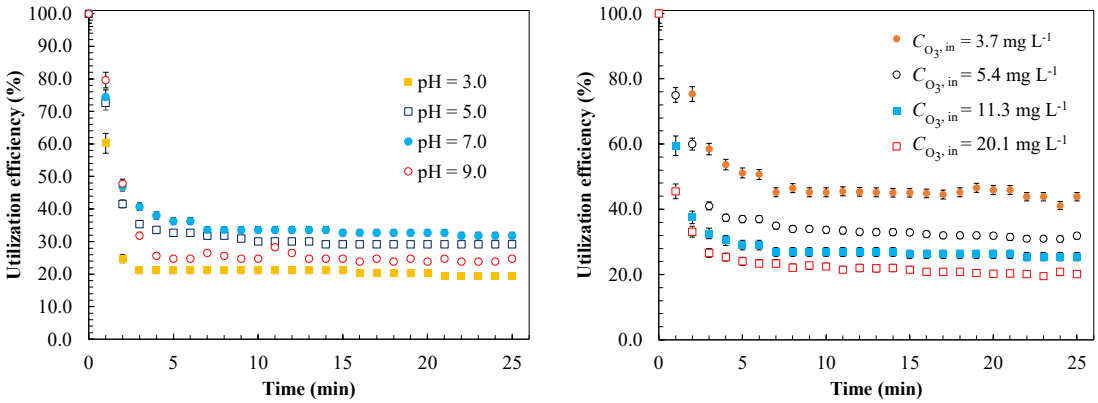
Supplementary Materials



(**a**) (**b**)

Figure S1. Utilization efficiencies of ozone in a TiO_2/GAC catalytic system at different pHs (**a**) [1] and inlet ozone concentrations (**b**) [2] in the experimental ozonation system. Experimental conditions: Q_G = 4 L min^{-1}; M_{CAT} = 3.3 g L^{-1}; T = 18.0 °C; P = 1 atm; V_{reac} = 1.5 L; (*Agitation*) = 60 rpm. [1] $C_{O_3,in}$ = 11.3 mg L^{-1}. [2] pH = 7.0.

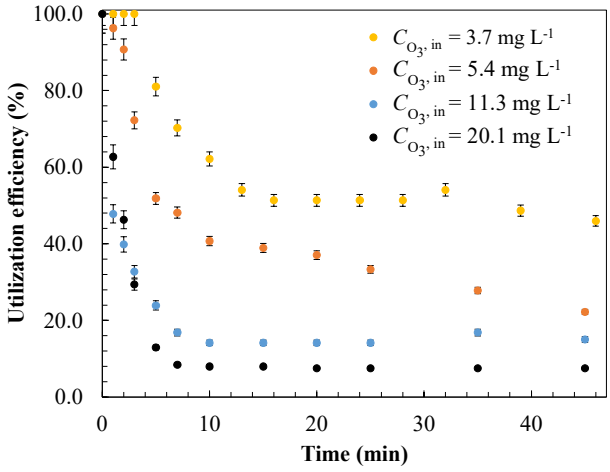
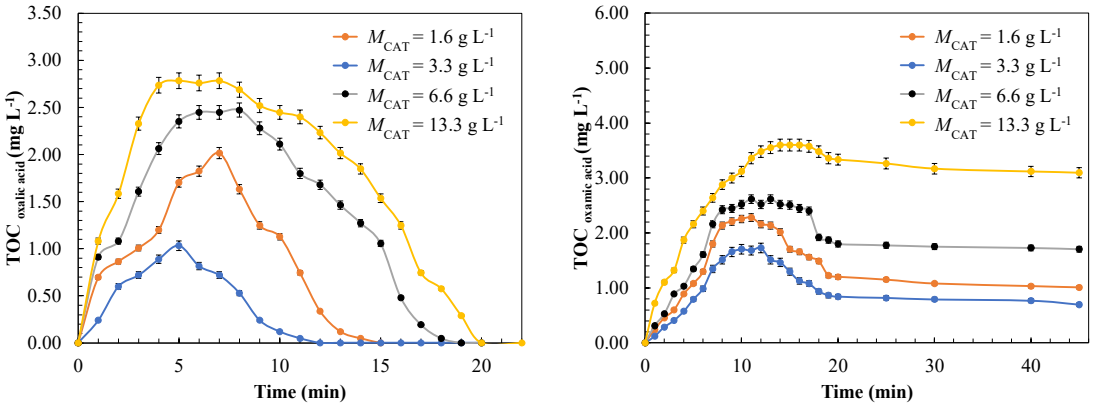
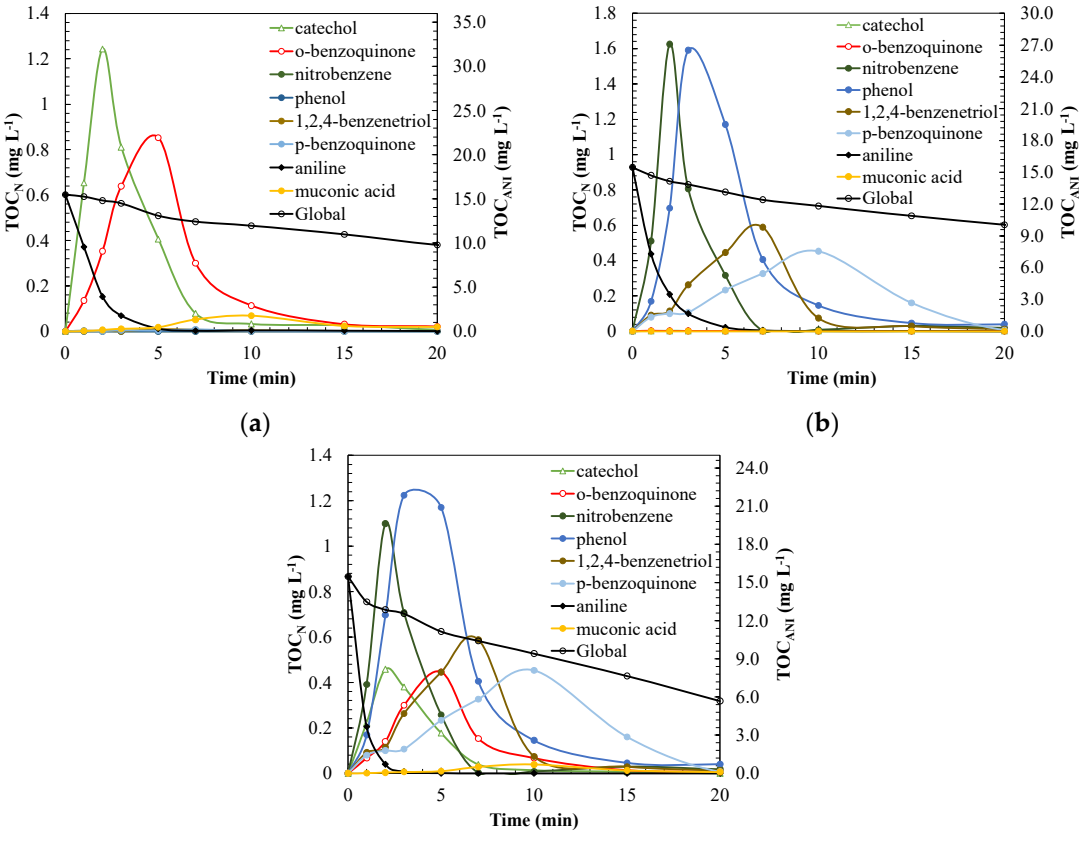


Figure S2. Effect of the ozone dose on the control stage during catalytic ozonation of aniline with the TiO_2/GAC catalyst. Experimental conditions: Q_G = 4 L min^{-1}; pH = 7.0; M_{CAT} = 3.3 g L^{-1}; T = 18.0 °C; P = 1 atm; V_{reac} = 1.5 L; (*Agitation*) = 60 rpm.



(**a**) (**b**)

Figure S3. Analysis of some by-products formed during the TiO_2/GAC ozonation of aniline in terms of TOC. Effect of catalyst dosage on the evolution of: (**a**) oxalic and (**b**) oxamic acid during ozonation. Experimental conditions: Q_G = 4 L min^{-1}; $C_{O_3,in}$ = 5.4 mg L^{-1}; pH = 7.0; T = 18.0 °C; P = 1 atm; V_{reac} = 1.5 L; (*Agitation*) = 60 rpm.



(**a**) (**b**)

(**c**)

Figure S4. Analysis of the main intermediates in the aniline catalytic ozonation with TiO_2/GAC in terms of TOC, excluding oxalic and oxamic acid in different cases: (**a**) molecular attack of ozone at pH = 3.0; (**b**) ozone in excess and dominance of radicalary attack (pH = 7.0 and ozone dose of 20.1 mg L^{-1}); and (**c**) most favourable conditions (pH = 7.0, 5.4 mg L^{-1} ozone concentration) or combined molecular radicalary attack. Experimental conditions: Q_G = 4 L min^{-1}; M_{CAT} = 3.3 g L^{-1}; T = 18.0 °C; P = 1 atm; V_{reac} = 1.5 L; (*Agitation*) = 60 rpm.