Supplementary Material

Condensation By-Products in Wet Peroxide Oxidation: Fouling or Catalytic Promotion? Part I. Evidences of an Autocatalytic Process

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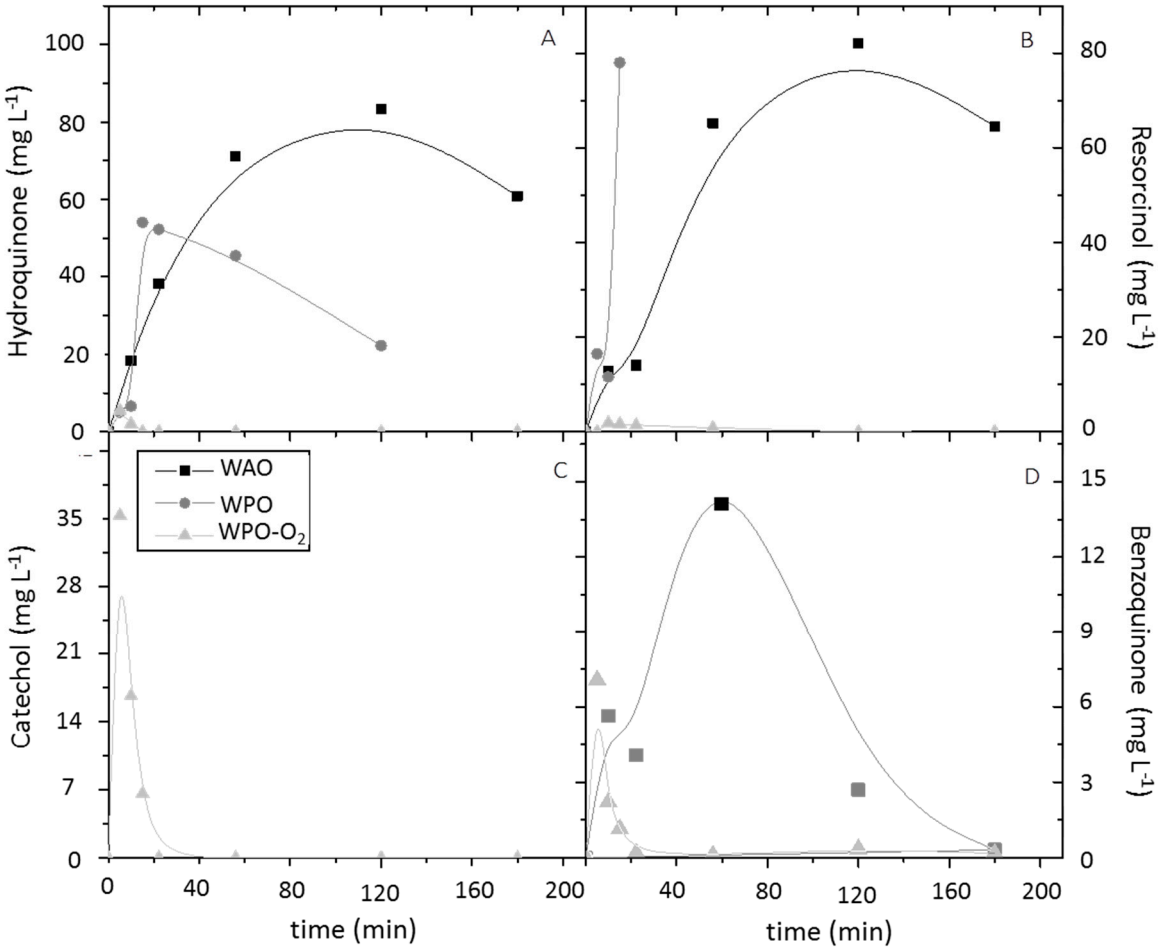

Figure S1. Temporal concentration profiles of hydroquinone, resorcinol, catechol and benzoquinone upon the treatment of phenol by WPO-O_2. Operating conditions: $[Phenol]_0$ = 1000 mg L^{-1}, $[H_2O_2]_0$ = 5000 mg L^{-1}, P_{O2} = 8 bar (92 N mL_{O2} min^{-1}), T = 127 ºC and natural pH_0.

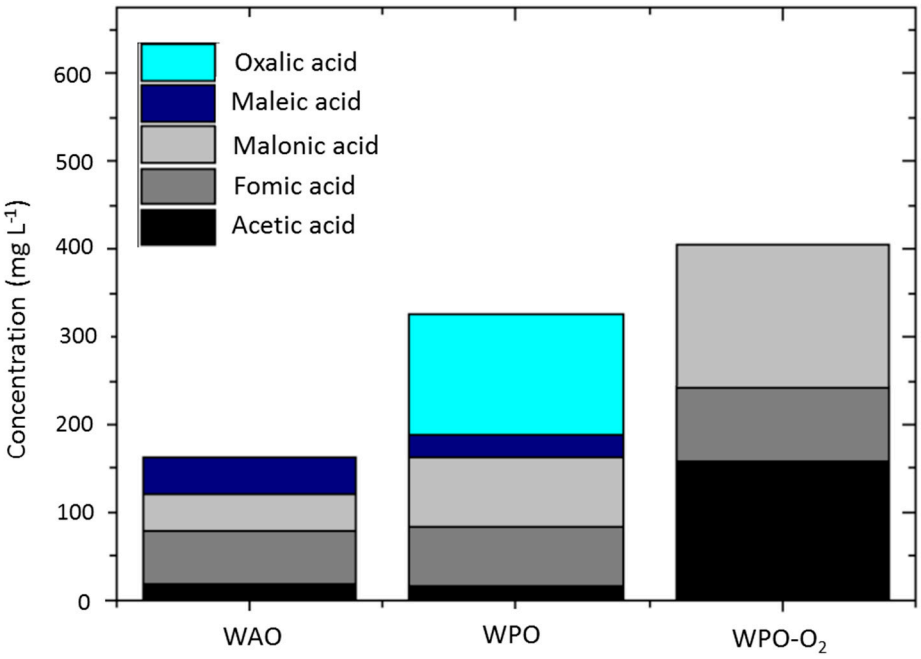

Figure S2. Short-chain organic acid distribution upon the WAO, WPO and WPO-O2 of phenol after 3 h of reaction. Operating conditions: $[Phenol]_0$ = 1000 mg L^{-1}, $[H_2O_2]_0$ = 5000 mg L^{-1}, P_{O2} = 8 bar (92 N mL_{O2} min^{-1}), T = 127 ºC and natural pH_0.

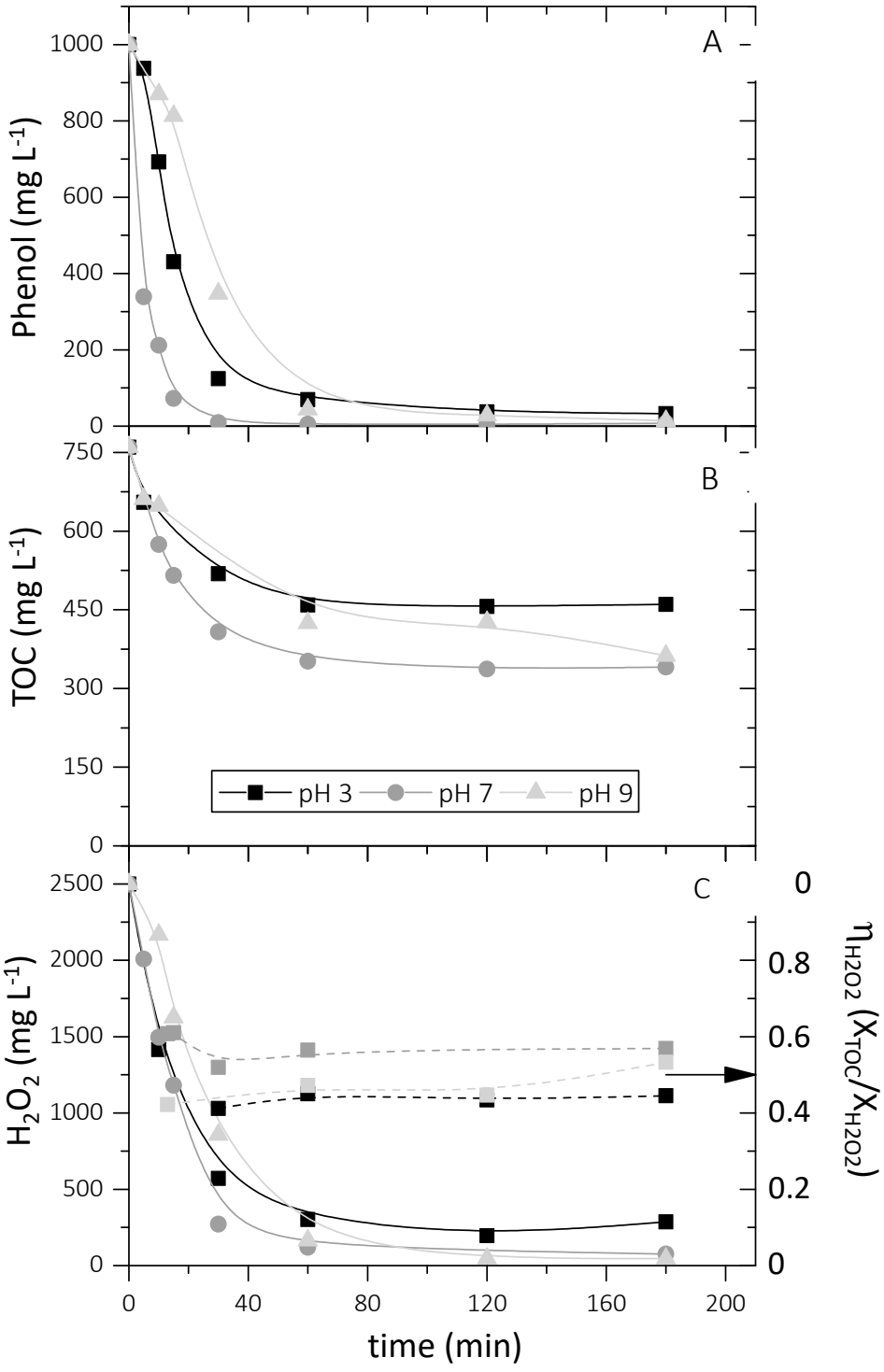

Figure S3. Effect of the pH_0 on the phenol WPO-O_2. Operating conditions: $[Phenol]_0$ = 1000 mg L^{-1}, $[H_2O_2]_0$ = 2500 mg L^{-1}, T=127 ºC and P_{O2} = 8 bar.

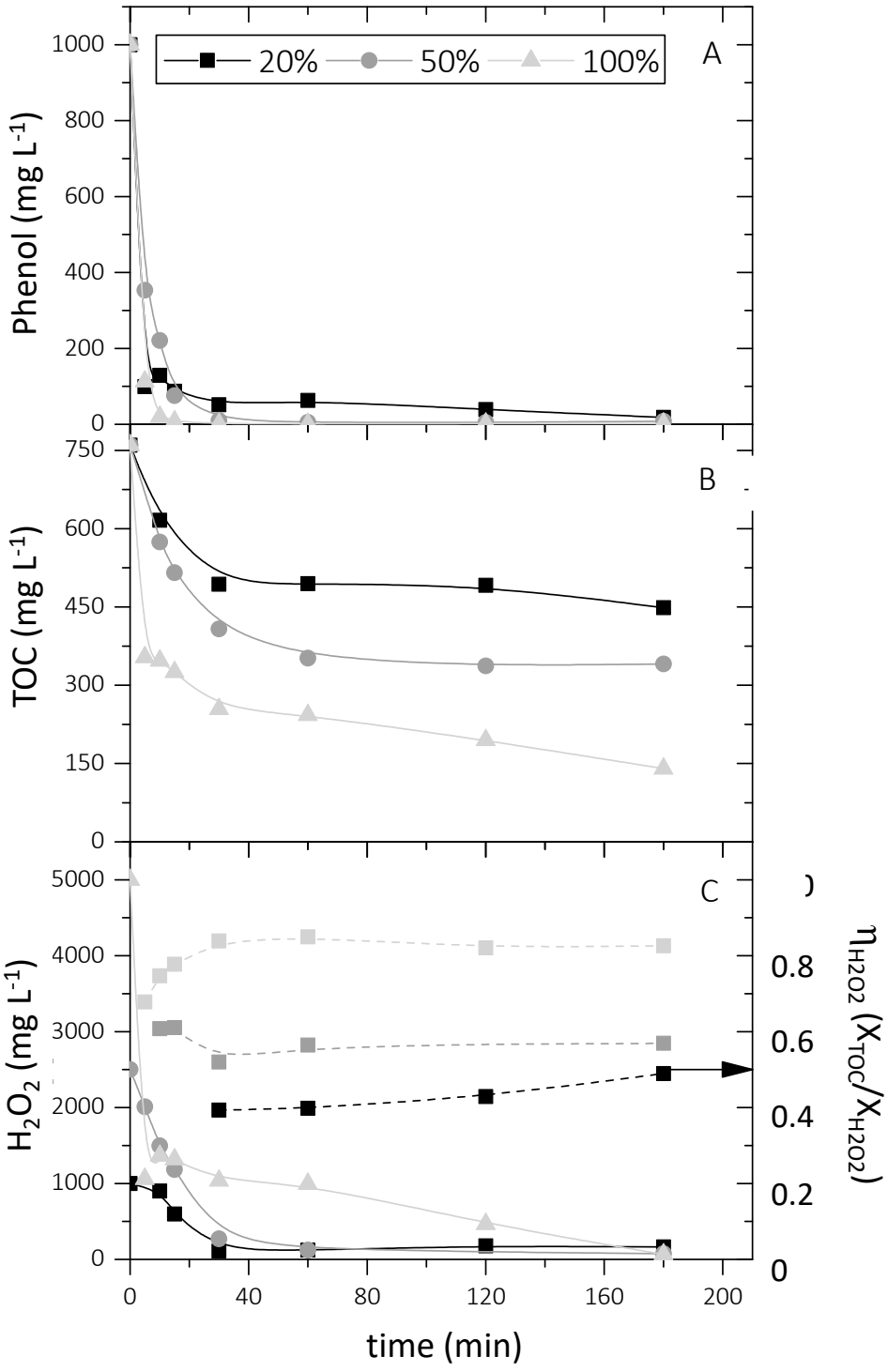

Figure S4. Effect of the H_2O_2 dose on the phenol WPO-O_2. Operating conditions: $[Phenol]_0$ = 1000 mg L^{-1}, T=127 ºC, P_{O2} = 8 bar and natural pH_0.

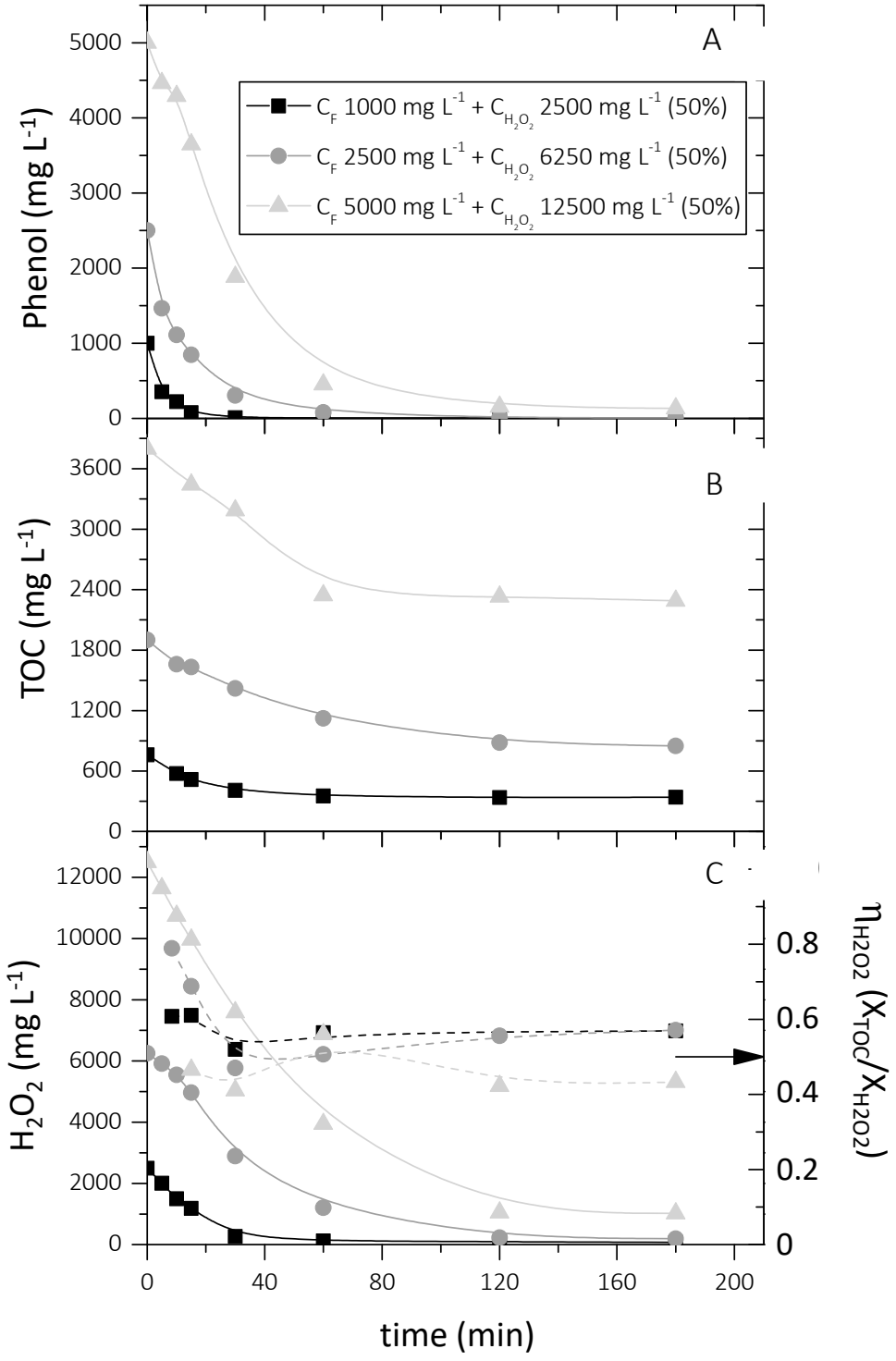

Figure S5. Effect of the initial phenol concentration on the phenol WPO-O_2. Operating conditions: T=127 ºC, P_{O2} = 8 bar and natural pH_0.

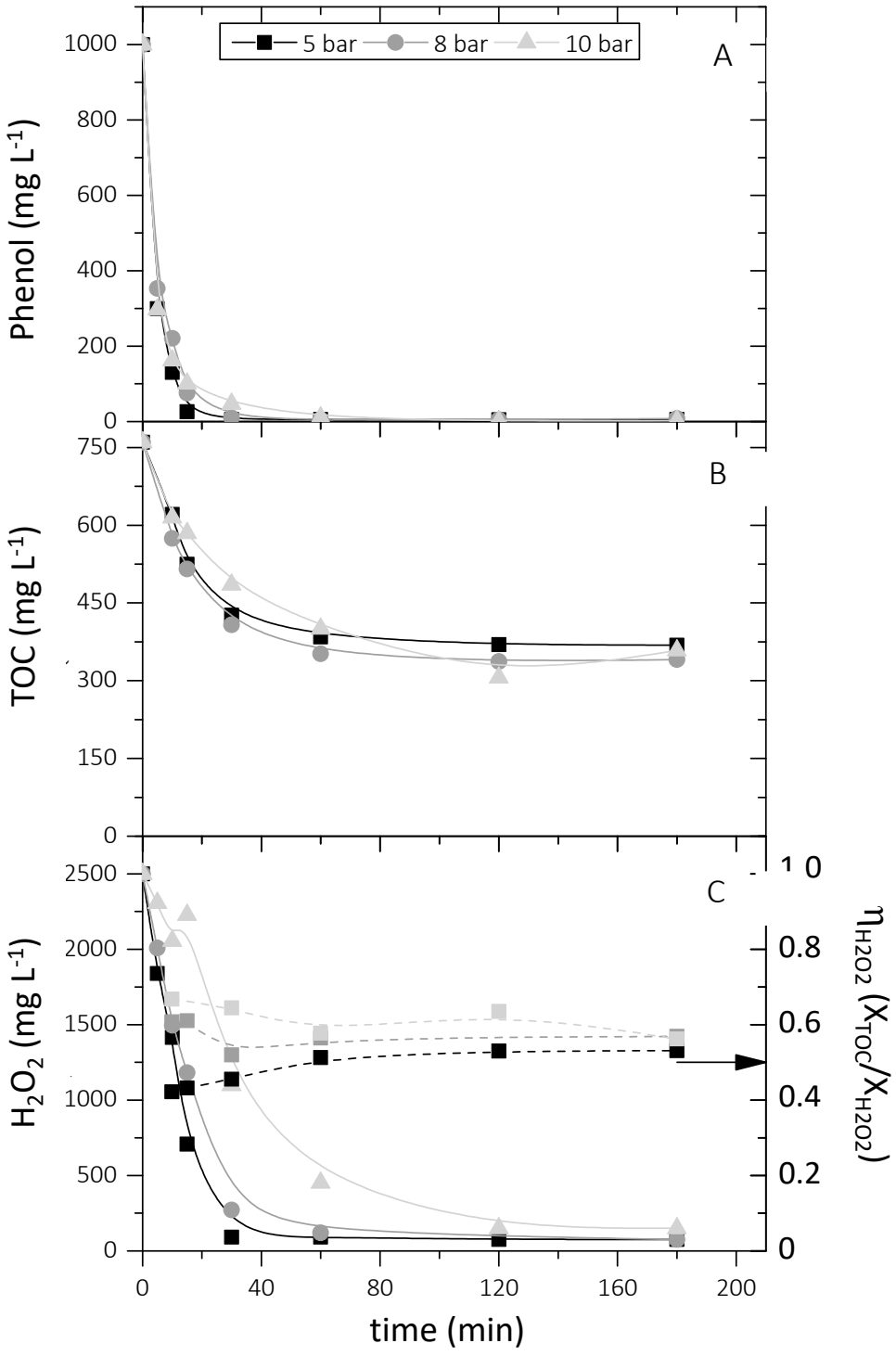

Figure S6. Effect of the oxygen pressure on the phenol WPO-O_2. Operating conditions: $[Phenol]_0$ = 1000 mg L^{-1}, $[H_2O_2]_0$ = 2500 mg L^{-1}, T=127 ºC, P_{O2} = 8 bar and natural pH_0.

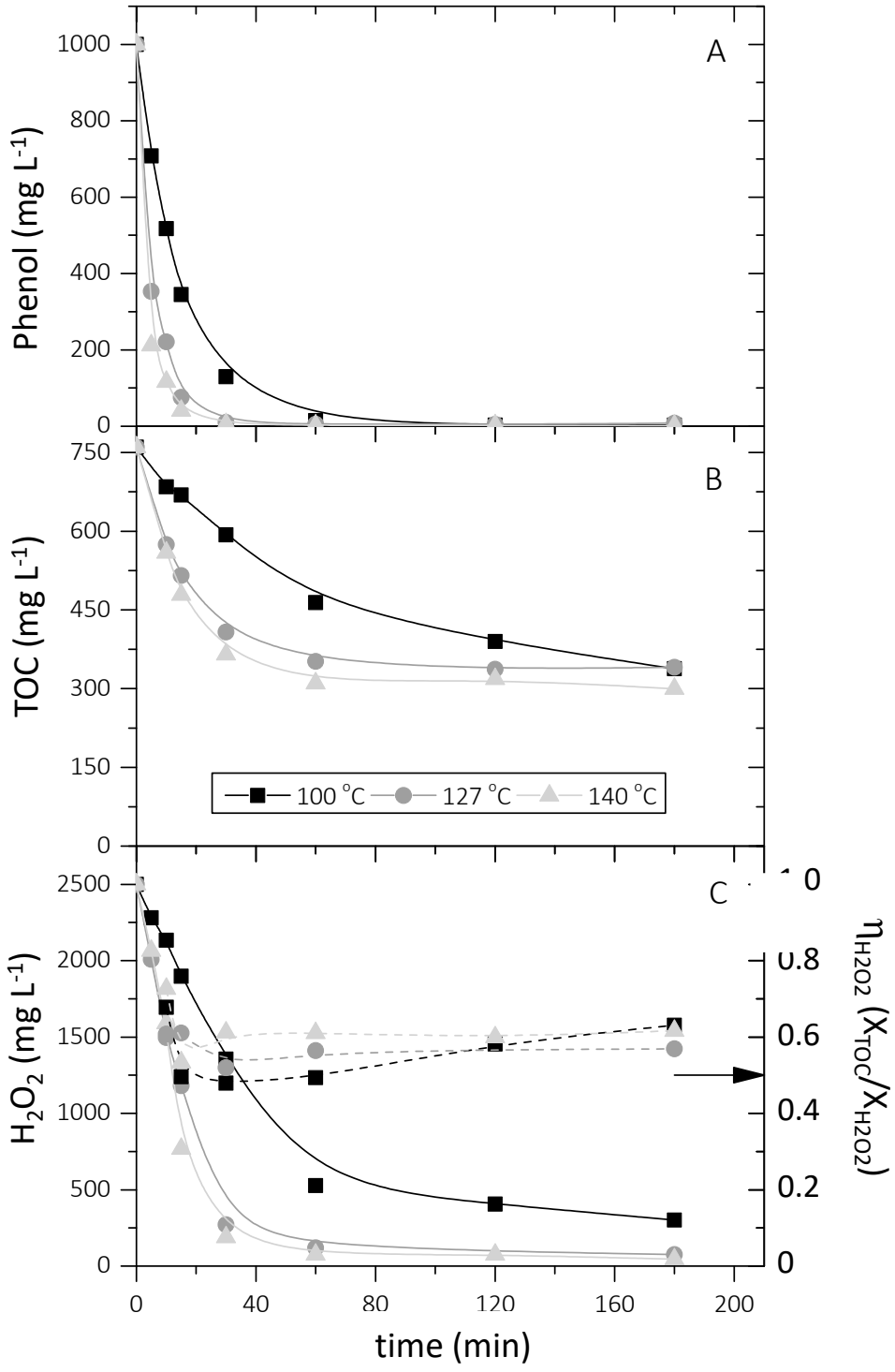

Figure S7. Effect of the temperature on the phenol WPO-O_2. Operating conditions: $[Phenol]_0$ = 1000 mg L^{-1}, $[H_2O_2]_0$ = 2500 mg L^{-1}, P_{O2} = 8 bar and natural pH_0.

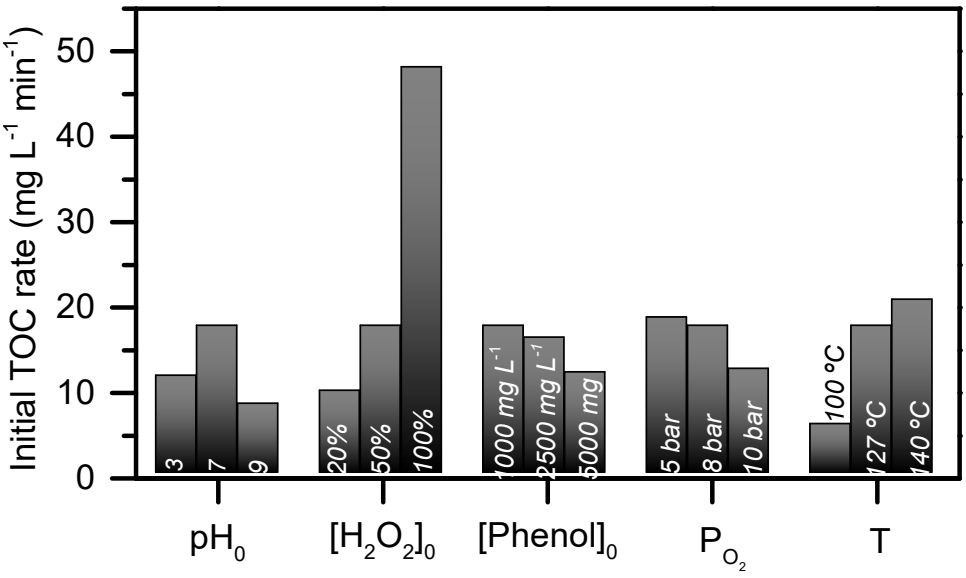

Figure S8. Effect of the operating conditions on the initial TOC abatement rate upon WPO-O_2 process. Standard conditions: $[Phenol]_0$ = 1000 mg L^{-1}, $[H_2O_2]_0$ = 2500 mg L^{-1}, P_{O_2} = 8 bar, T = 127 ºC and natural pH_0.

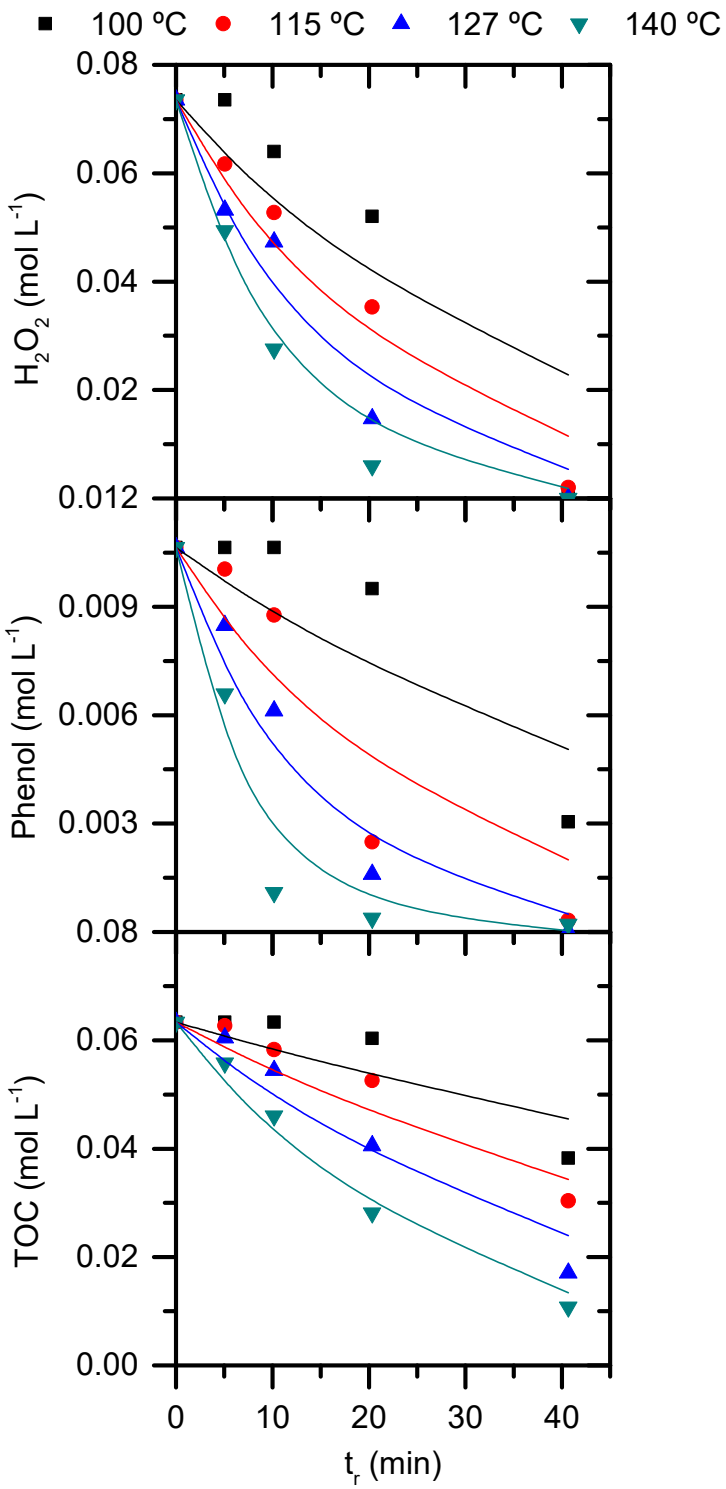

Figure S9. Experimental (symbols) and predicted (lines) concentrations of H_2O_2, phenol and TOC by the pseudo-first order kinetic model of the phenol WPO-O_2 over quartz beads at different temperatures. Operating conditions: $[Phenol]_0$ = 1000 mg L^{-1}, $[H_2O_2]_0$ = 2500 mg L^{-1}, P_{O2} = 8 bar, natural pH_0 and $W_{quartz\ beads}$=29 g.

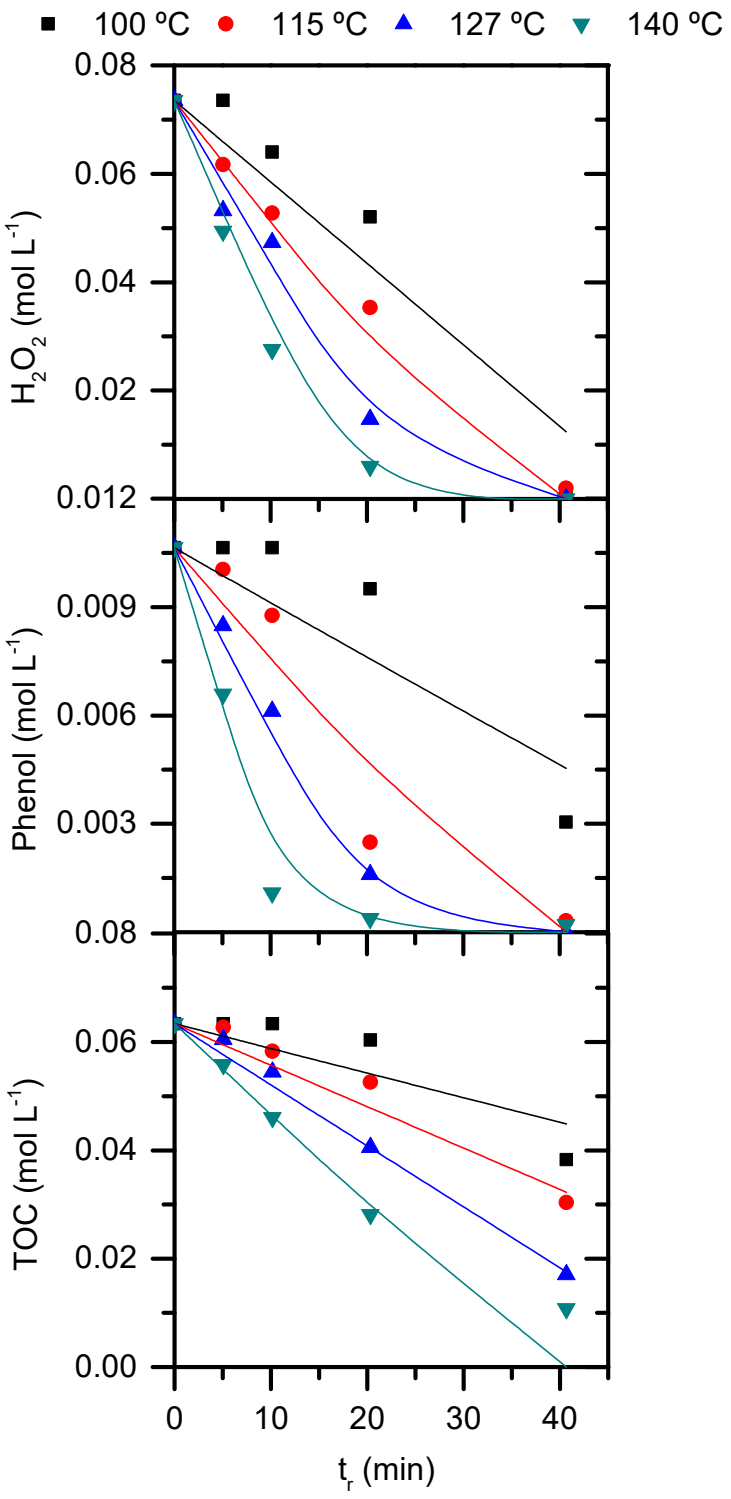

Figure S10. Experimental (symbols) and predicted (lines) concentrations of H_2O_2, phenol and TOC by the LHHW kinetic model of the phenol WPO-O_2 over quartz beads at different temperatures. Operating conditions: $[Phenol]_0 = 1000$ mg L^{-1}, $[H_2O_2]_0 = 2500$ mg L^{-1}, $P_{O2} = 8$ bar, natural pH_0 and $W_{quartz\ beads}$=29 g.