

1 **Supplementary Material**

2 **Table S1** Ozone utilization with different gas and liquid velocities

| Gas velocity | | |
|--|--|--|
| Gas velocity (m s⁻¹) | Ozone utilization (mg L⁻¹) | Flux of ozone (mg m⁻²s⁻¹) |
| 0.13 | 10 | 1.33 |
| 0.27 | 10 | 2.66 |
| 0.40 | 8 | 3.19 |
| 0.53 | 7 | 3.72 |

| Liquid velocity | | |
|---|--|--|
| Liquid flow rate (mL min⁻¹) | Ozone utilization (mg L⁻¹) | Flux of ozone (mg m⁻²s⁻¹) |
| 200 | 11 | 1.95 |
| 300 | 12 | 3.19 |
| 400 | 13 | 4.61 |
| 500 | 13 | 5.76 |

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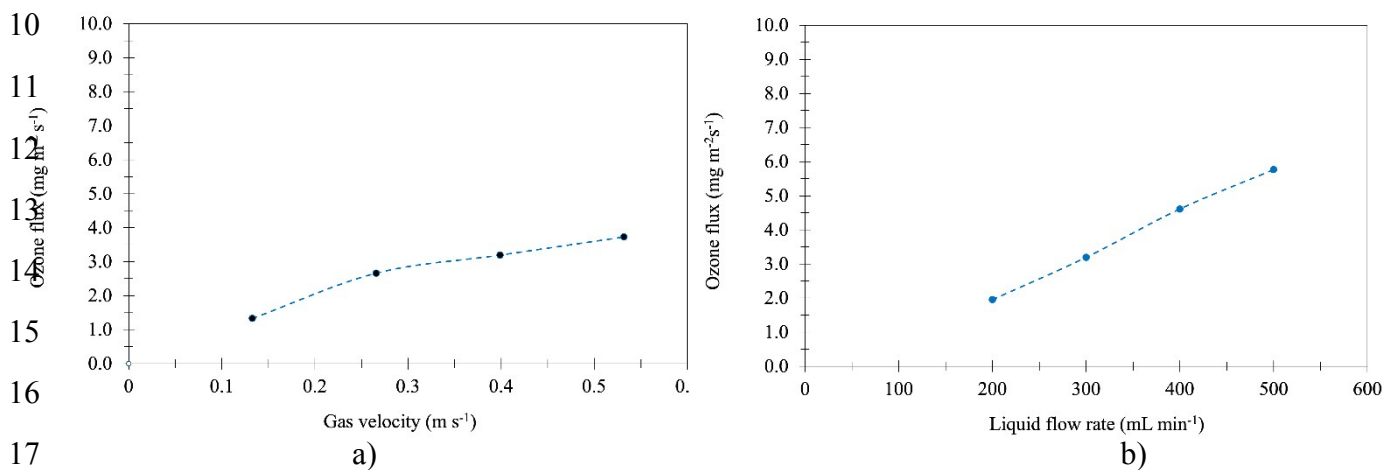
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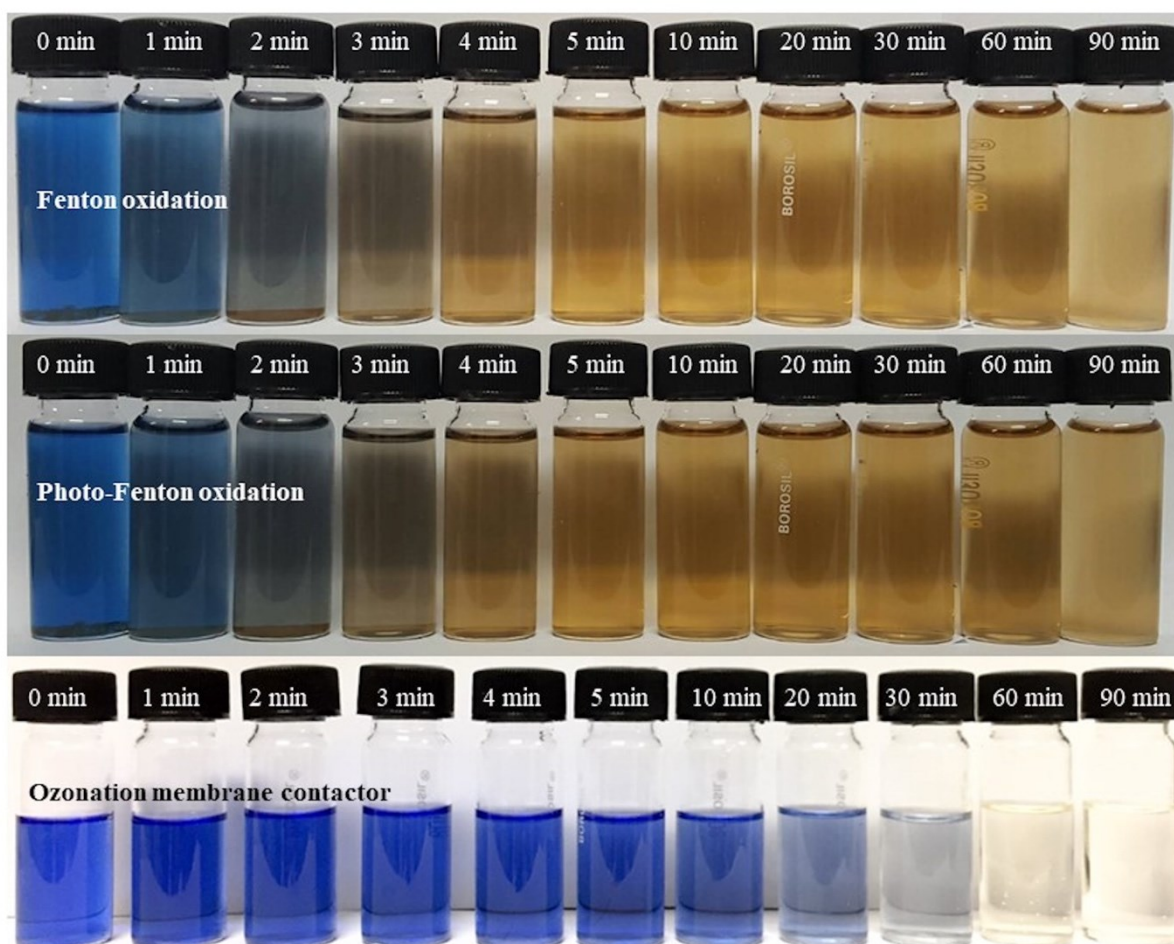
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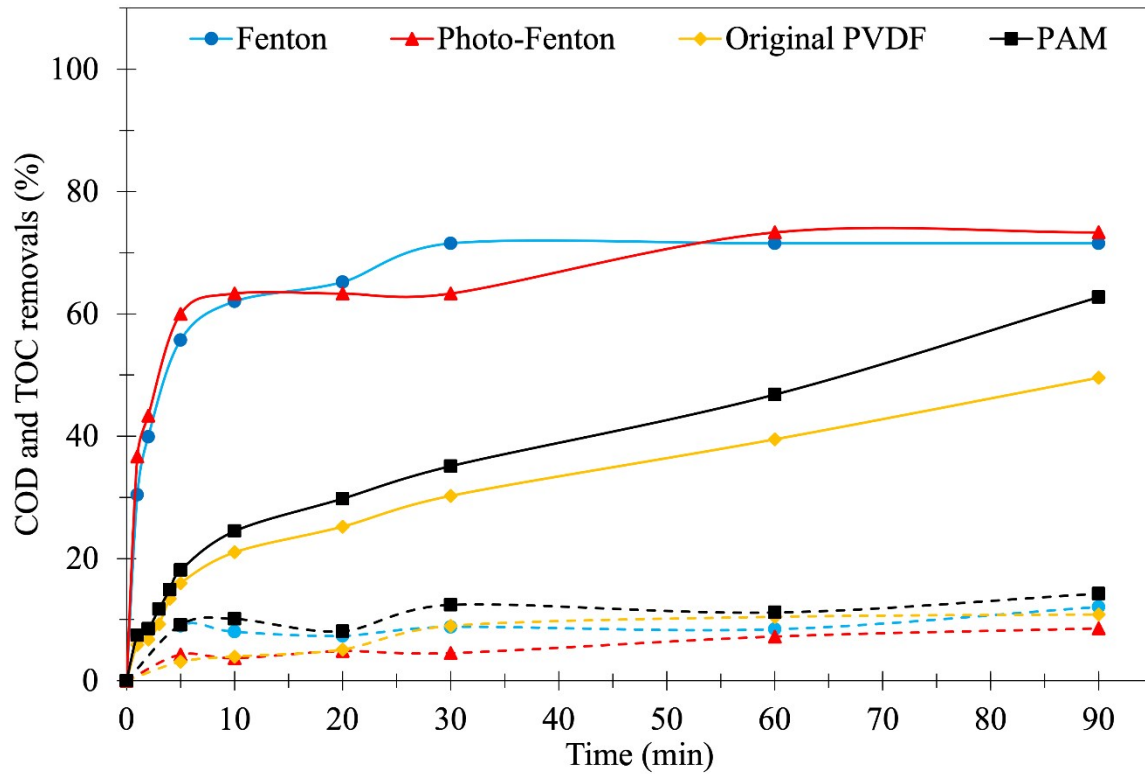
18 **Figure S1.** Effect of affecting parameters on ozone flux using 0.075 mM of RB 19: a) gas
 19 velocity and b) liquid velocity.

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22 **Figure S2.** Illustration of RB 19 after treatment by Fenton oxidation, photo-Fenton oxidation
 23 and ozonation membrane contactor using PVDF-PAM membrane at different times.



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26 **Figure S3.** The variation of COD TOC and BOD₅/COD after 90 min of RB 19 decolorization
 27 by Fenton oxidations and ozonation membrane contactor with different membranes

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(solid lines = COD removal and dashed lines = TOC removal)

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