Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supporting information for

Complex kinetics and significant influences of bromine removal in ferroin-bromate-metol reaction

Jun Li, and Jichang Wang*

Department of Chemistry and Biochemistry,

University of Windsor, Windsor, ON, N9B 3P4, Canada

* Corresponding author: Email: jwang@uwindsor.ca; fax 1-519-973-7098

Figure S1. Time series of ferroin-bromate-metol reaction at different acid concentrations (a) 1.8 M, (b) 1.7 M, (c) 1.3 M, and (d) 0.3 M. Other reaction conditions are [metol] = 0.025 M, [$NaBrO_3$] = 0.05 M, and [ferroin] = 1.0×10^{-4} M. The reactor was unsealed to allow volatile species diffuse out and air diffuses into the reactor.

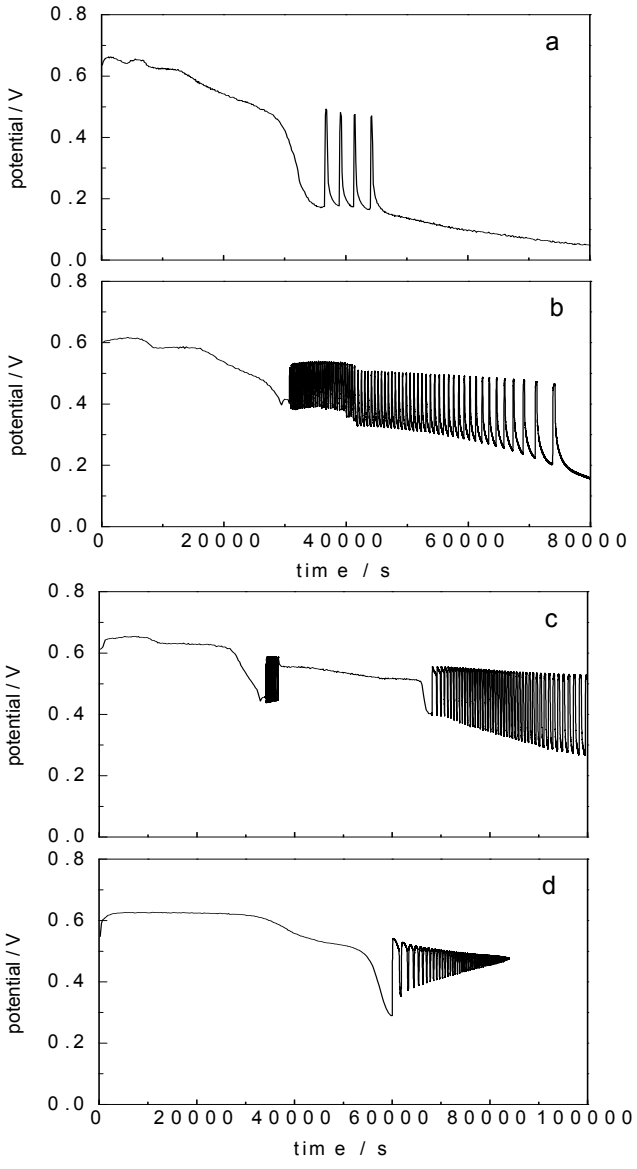

Figure S2. Time series of ferroin-bromate-metol reaction at different initial concentrations of ferroin: (a) 2.5×10^{-5} M, (b) 5.0×10^{-5} M, (c) 2.0×10^{-4} M, and (d) 4.0×10^{-4} M. Other reaction conditions are [metol] = 0.025 M, [$NaBrO_3$] = 0.05 M, and [H_2SO_4] = 1.7 M. The reactor was unsealed to allow volatile species diffuse out and air diffuses into the reactor.

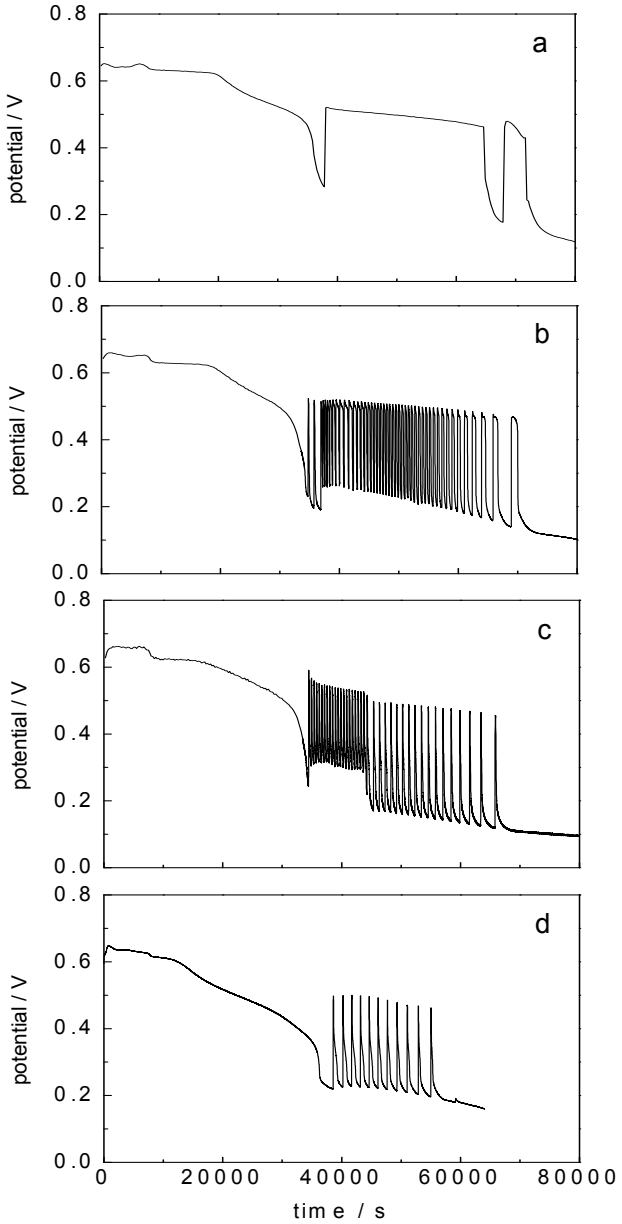

Figure S3. The influence of stirring rate on the oscillatory behavior: (a) 1200, (b) 900, and (c) 600 RPM, where oxygen was flowed into the reactor at a rate 60 ml/min. Other reaction conditions were [Metol] = 0.025M, [BrO_3^-] = 0.05M, [H_2SO_4] = 1.7M, and [Ferroin] = $1.0x10^{-4}$M

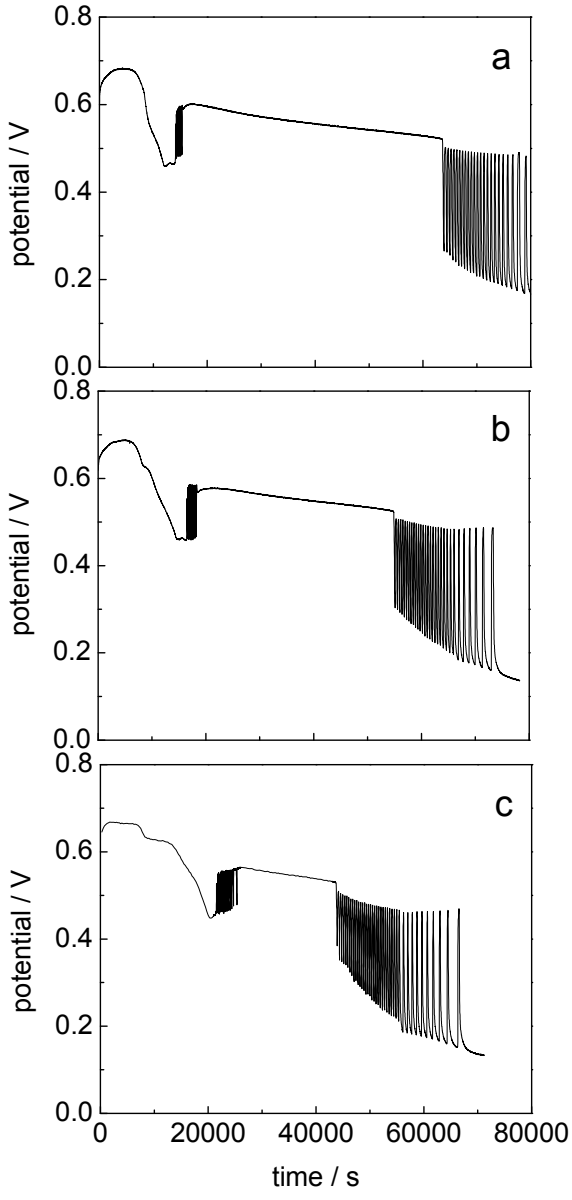

Figure S4. Influences of stirring rate on the oscillatory behavior: (a) 1200 and (b) 600 RPM, where nitrogen was flowed into the reactor at a rate 60 ml/min. Other reaction conditions were [Metol] = 0.025M, [BrO_3^-] = 0.05M, [H_2SO_4] = 1.7M, and [Ferroin] = 1.0 x 10^{-4} M

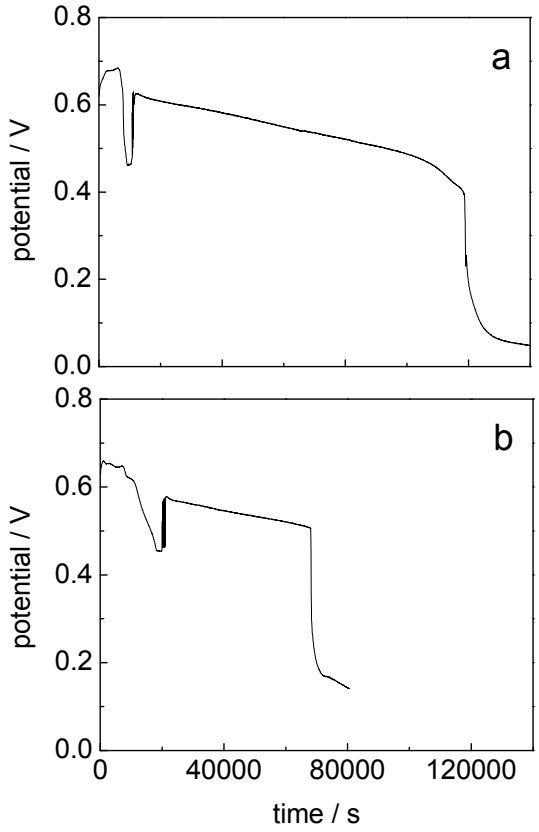

Figure S5. Time series of ferroin-bromate-metol reaction at different initial concentrations of metol: (a) 0.025 M, (b) 0.02 M. Other reaction conditions are [$NaBrO_3$] = 0.05 M, [Ferroin] = 1.0 x 10^{-4} M, and [H_2SO_4] = 1.7 M. The reactor was unsealed to allow volatile species diffuse out and air diffuses into the reactor.

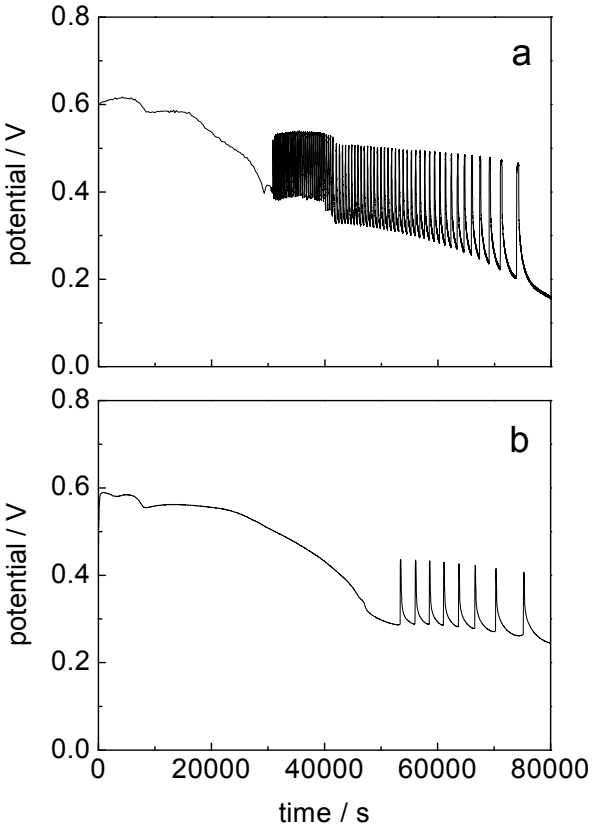

Figure S6. ^{13}C NMR (500MHz) spectra of the ferroin-bromate-metol reaction at the conditions [Metol] = 0.025 M, [$NaBrO_3$] = 0.05 M, [Ferroin] = $1.0x10^{-4}$ M and [H_2SO_4] = 1.7 M, (a) sealed with parafilm, and (b) flowing nitrogen gas above the solution surface.

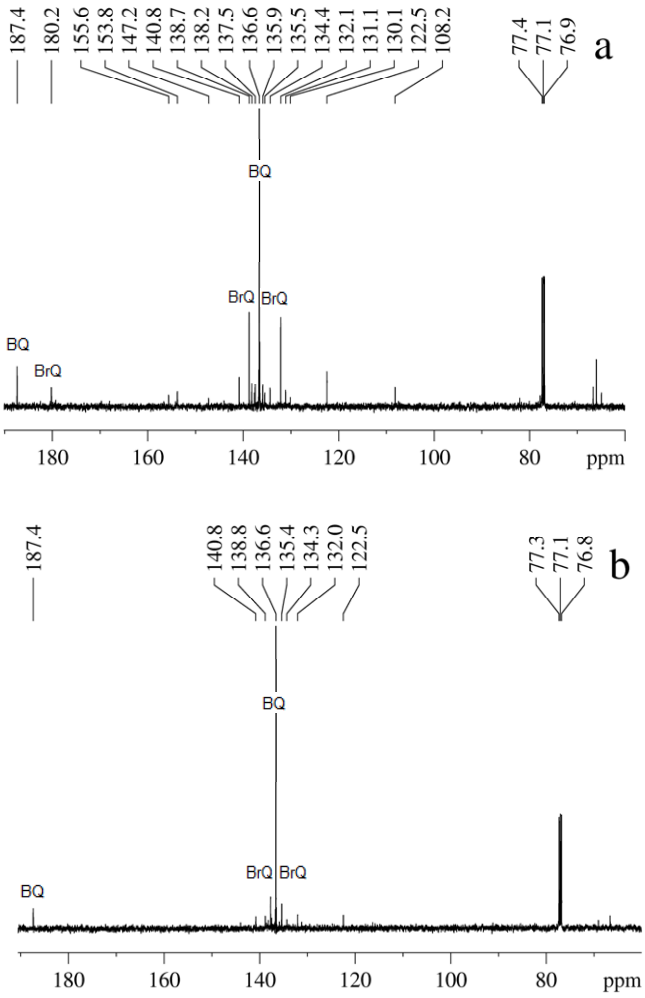

Figure S7. Influence of nitrogen flow rate on the oscillatory behavior (a) 40, (b) 60, and (c) 80 ml/min. Other reaction conditions were [Metol] = 0.025M, [BrO_3^-] = 0.05M, [H_2SO_4] = 1.7M, [Ferroin] = 1.0 x 10^{-4} M, and the reaction solution volume was 20 ml.