Supplemental Information

A 2 m long section of 1.5 mm ID PTFE tubing was cut and coiled to maintain a bundle diameter of 6 inches (152 mm). This bundle was then submerged and suspended using wire in a well stirred, silicone oil bath heated to the reaction temperature of 158 °C. The volumetric flowrates were calculated based on the length and inner diameter of the PTFE tubing and the required residence time that was controlled by a syringe pump. It is assumed that the silicone oil bath is well-stirred, maintaining a constant, high Nu outside of the reaction tubing and due to laminar flow conditions, the Nu inside the reaction tubing is assumed to remain relatively constant but at a lower value. A reaction was conducted to analyze every fourth minute of residence time. Using residence times, calculated flowrates, and fluid properties, the *Re* and *Nu* were calculated at each residence time to show laminar conditions exist in the tubing and that *Nu* are relatively constant at a low value across the calculated flowrates. The calculated flow rates, dimensionless numbers, and the heat transfer coefficients are shown in **Table S1**.

Table S1. Flow Rates, *Re, De, Nu*, and the Heat Transfer Coefficients Were Calculated for Each Residence Time.

Residence Time (min)	Flowrate (µl min^{-1})	*Re*	*Da*	*De*	*Nu*	Heat Transfer Coefficient (W m^{-2} K^{-1})
4	900	8.5	0.004	0.85	4.61	866.6
8	450	4.2	0.008	0.42	4.33	813.8
12	300	2.8	0.013	0.28	4.21	790.6
16	225	2.1	0.018	0.21	4.13	776.8
20	180	1.7	0.022	0.17	4.08	767.4
24	150	1.4	0.027	0.14	4.04	760.4
28	129	1.2	0.030	0.12	4.02	755.1
32	112	1.1	0.035	0.10	4.00	750.5
36	100	0.9	0.040	0.09	3.97	747.0
40	90	0.8	0.044	0.08	3.96	744.0

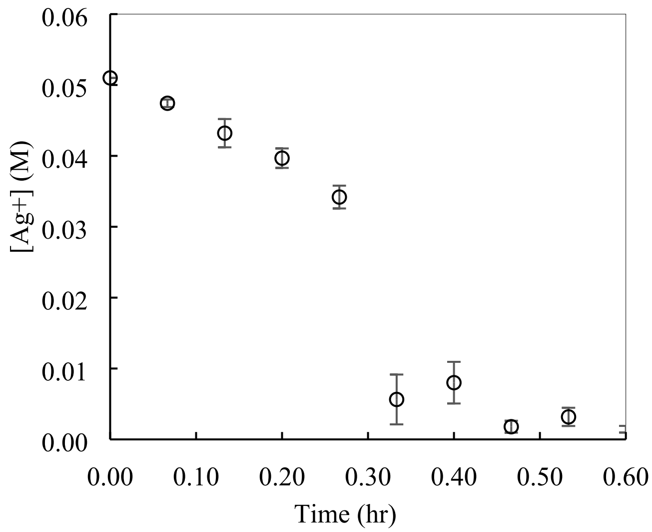

Fig. S1. *The [Ag^{+}] over time using constant tubing lengths in a MFR.*

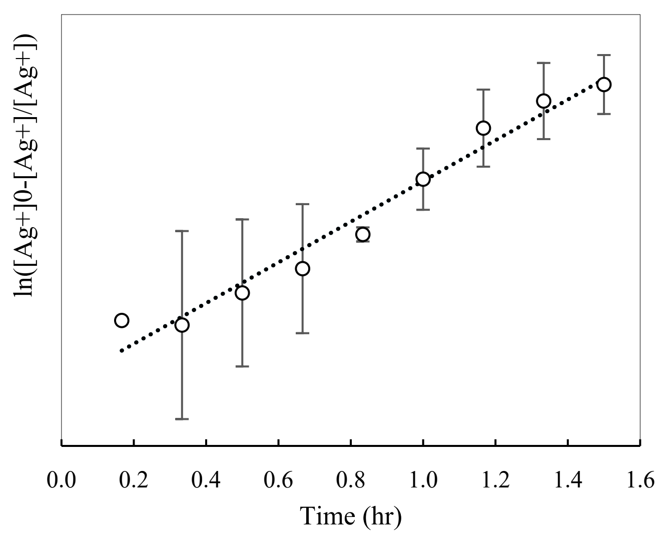

Fig. S2. *The linearized form of the Finke-Watzky model applied to the batch data.*

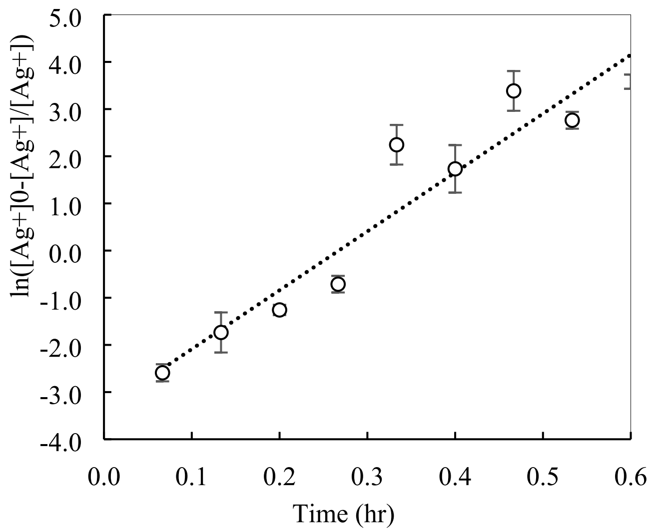

Fig. S3. *The linearized form of the Finke-Watzky model applied to the MFR data for constant tubing lengths.*

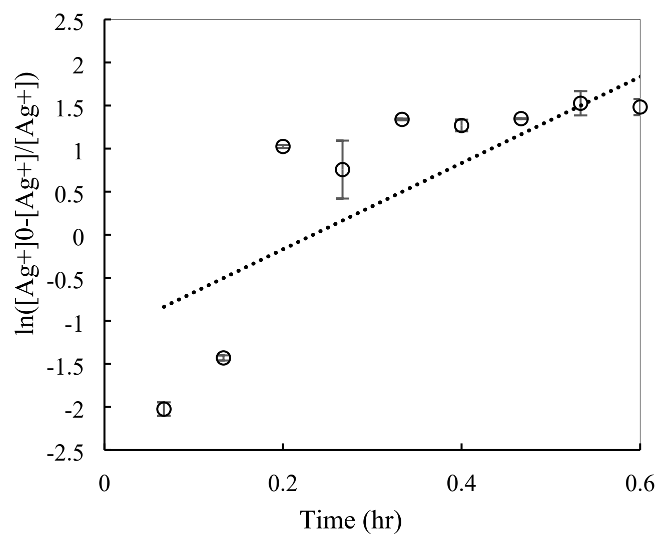

Fig. S4. *The linearized form of the Finke-Watzky model applied to the MFR data for constant flowrates.*

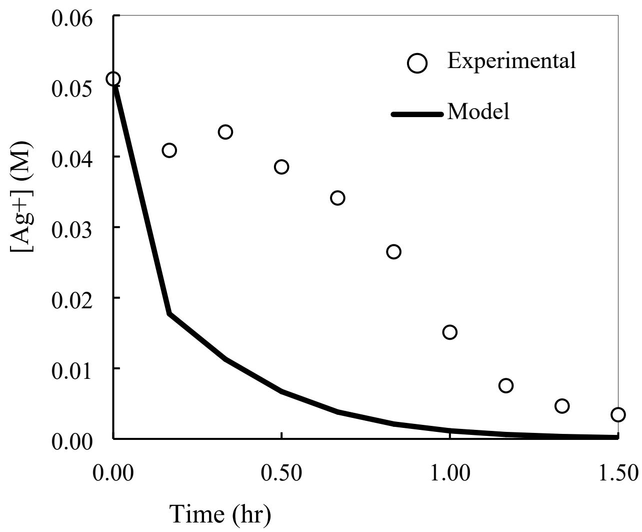

Fig. S5. *Graph of the linearized batch model and data. The SSE for this model is 4.4×10-3.*

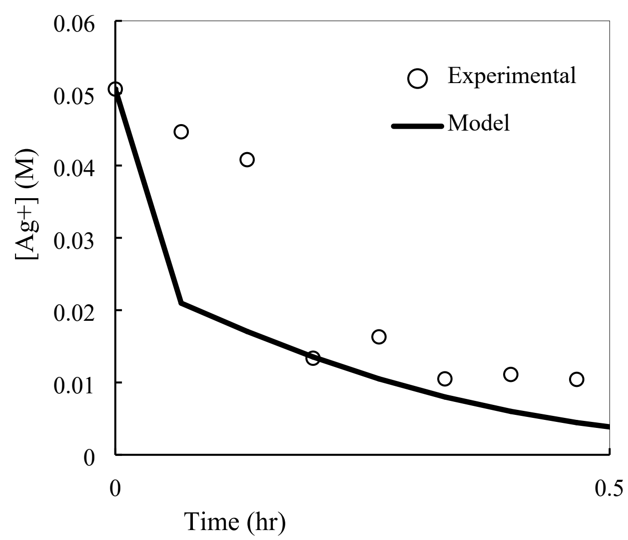

Fig. S6. *Graph of the linearized MFR model and data for constant flowrates. The SSE for this Model is 1.3×10-3.*

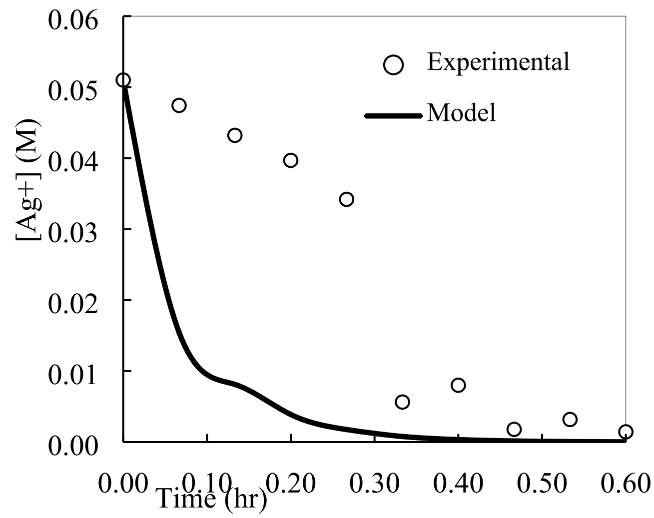

Fig. S7. *Graph of the linearized MFR model and data for constant flowrates. The SSE for this Model is 4.7×10*$^{-3}$.

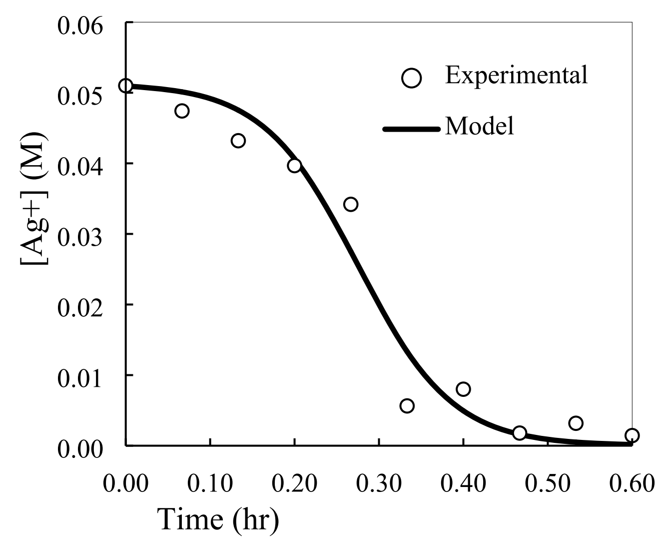

Fig. S8. *Non-linear fit of [Ag*$^{+}$*] as a function of reaction time in the MFR for constant tubing lengths.*

Table S2. *Rate Constant values Compared between Batch and the Millifluidic Reactor using Two Different Method of varying Length and Flow Rate.*

	Linear Model			Non-Linear Model		
Reactor	**k_1, hr^{-1}**	**k_2, $hr^{-1}M^{-1}$**	**SSE**	**k_1, hr^{-1}**	**k_2, $hr^{-1}M^{-1}$**	**SSE**
Batch	0.011	74.0	4.4×10^{-3}	0.18	71.9	7.9×10^{-5}
MFR (Constant Flow Rate)	0.079	98.9	1.3×10^{-3}	0.79	158.3	3.8×10^{-4}
MFR (Constant Tubing Length)	0.023	244.7	4.7×10^{-3}	0.12	350.3	1.5×10^{-4}