Supplementary Information for “A quantitative study of the effect of flow on the photopolymerization of fibers”

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Figure S1: Intensity as a function of flow rate for fibers produced with lengths of equal relative deviations from $l_1$. The intensity $I$ required to produce fibers with equal fractional deviations relative to $l_1$ varies linearly with flow rate $Q_1$. The slopes decrease with larger negative deviations from $l_1$. These linear relationships support our conclusion that the difference between the fiber’s length $l_f$ and $l_1$ can be used to indicate its relative degree of polymerization and rigidity.
Figure S2: Fiber length as a function of intensity for varying flow rates. Each regime of fiber production is represented by a bar with a different grayscale intensity, and corresponds to the data points directly above it (see color code and refer to Figure 6 in the main text). As $Q_1$ increases, the three regimes of fiber production spread out, becoming disproportionately large. This behavior can be seen most easily in the nonlinear growth of the first regime of fiber production, represented as the lightest gray bars. It can also be observed in the appearance of the transitional second regime of fiber production, which was not observed in the fiber samples produced with the lowest $Q_1$, but became apparent as $Q_1$ was increased. The data within the third regime of fiber production for each flow rate was fit with a power function (using least squares regression), represented by the dotted lines, of the form $l_f = cI^n$, where $c$ is a prefactor and $n$ is the power law exponent. Both $c$ and $n$ vary with $Q_1$. For $Q_1 = 0.16$ ml/h, $n = 0.32$ and the coefficient of determination $R^2 = 0.9767$. For $Q_1 = 0.28$ ml/h, $n = 0.16$ and $R^2 = 0.9793$. For $Q_1 = 0.44$ ml/h, $n = 0.083$ and $R^2 = 0.9356$. 

\[ l_f = cI^n \]
Figure S3: Flow rate versus average percent difference in fiber length for regular 0.0013 E/(m² s) increases in intensity. The difference $\Delta l_f$ in fiber length from one trial to the next was taken, and these values were averaged for all trials within a given $Q_1$ and divided by the average $\langle l_f \rangle$ for all trials of that $Q_1$. As $Q_1$ increases, the average difference in $l_f$ between consecutive trials significantly decreases.