

Supplementary material

**Behavior of weakly adsorbing protein impurities in
flow-through ion-exchange chromatography**

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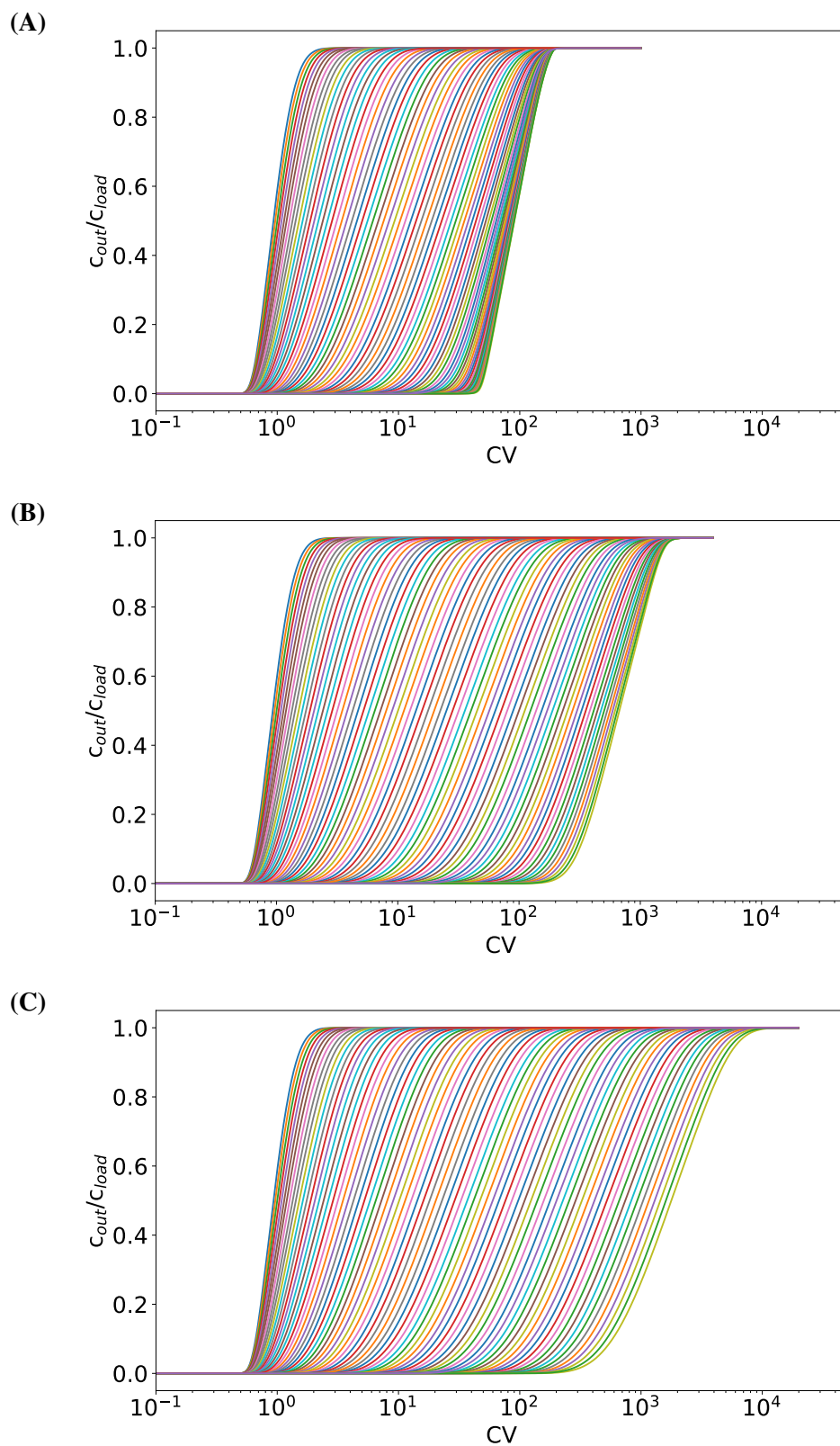


Figure S1: Breakthrough profiles from a simulation of solute loading at (A) 1 mg/ml, (B) 100 $\mu\text{g/ml}$, and (C) 10 $\mu\text{g/ml}$. Lines correspond to simulations with different K_{eq} , which increases by 4 orders of magnitude from left to right. Note that q_{max} was fixed at 100 mg/ml of packed column for all simulations, and the abscissa is on a logarithmic scale.

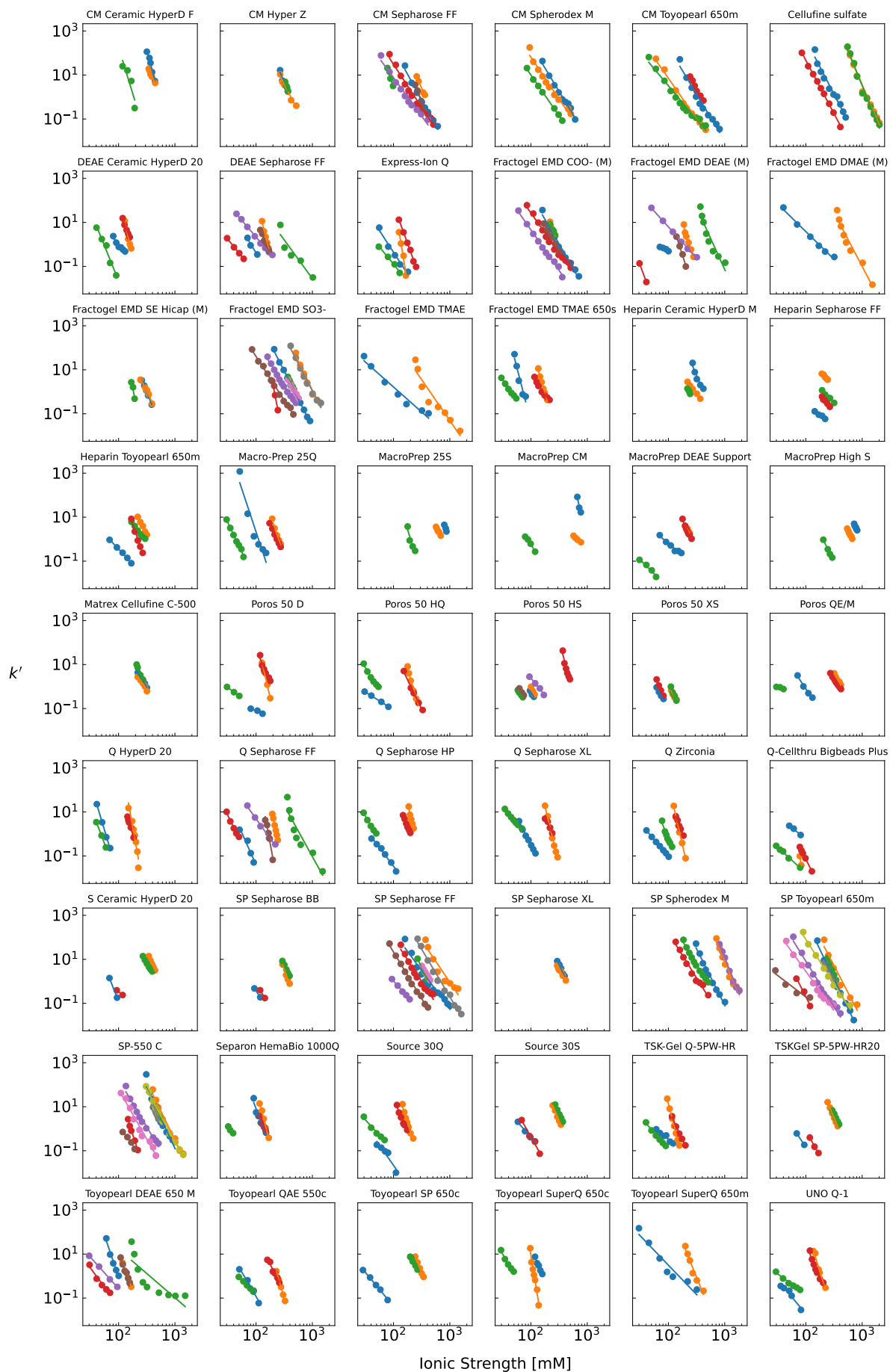


Figure S2: Isocratic k' data that were consolidated from the literature. Each series represents a unique protein-pH-resin combination, and lines represent quasi-SDM fits to the data. [These data, which are available in the Supplementary table_S2.xlsx file, were acquired by digitizing plots \(using the Engauge Digitizer software\), which may introduce some error into the precise \$k'\$ values.](#)

Table S1: Simulation parameters.

<u>Variable</u>	<u>Figures 1, 2, and S1</u>	<u>Figure 3</u>
<u>L_{col} [cm]</u>	<u>4.2</u>	<u>5.0 – 20.0</u>
<u>r_p [μm]</u>	<u>25.0</u>	<u>2.5 – 100.0</u>
<u>ε_c [-]</u>	<u>0.49</u>	<u>0.49</u>
<u>ε_p [-]</u>	<u>0.40</u>	<u>0.40</u>
<u>u, superficial velocity [cm/h]</u>	<u>300</u>	<u>100 – 200</u>
<u>D_{ax} [m^2/s]</u>	1.25×10^{-7}	<u>Function of u</u>
<u>k_{film} [m/s]</u>	1.0×10^{-3}	1.0×10^{-3}
<u>D_p [m^2/s]</u>	1.0×10^{-11}	5.0×10^{-12} – 4.0×10^{-11}
<u>a [m^2/s] (in $D_s = aK_{eq}^b$)</u>	7.76×10^{-12}	1.66×10^{-12}
<u>b [-] (in $D_s = aK_{eq}^b$)</u>	<u>–1.54</u>	<u>–0.24</u>
<u>K_{eq} [-]</u>	1.0 – 1.0×10^4	1.0 – 1.0×10^4
<u>q_{max} [mg/ml column]</u>	<u>100</u>	<u>100</u>
<u>c_{load} [mg/ml]</u>	1.0×10^{-3} – 1.0×10^1	1.0×10^{-3}