

Supplementary information:

Table S1. Description of buffer systems according to [19]

pH	molarity [mmol L <sup>-1</sup> ]	buffer system	acid	base
		acetate	1 M CH <sub>3</sub> COOH	CH <sub>3</sub> COONa
4.5	100		6.35 mL	291.0 mg
5.0	100		3.55 mL	529.3 mg
5.5	100		1.48 mL	698.5 mg
		phosphate	NaH <sub>2</sub> PO <sub>4</sub> * 2 H <sub>2</sub> O	Na <sub>2</sub> HPO <sub>4</sub> * 2 H <sub>2</sub> O
6.0	50		545.8 mg	51.6 mg
6.0	100		1091.6 mg	103.2 mg
6.5	100		970.6 mg	290.5 mg
7.0	50		358.8 mg	339.4 mg
7.0	100		717.6 mg	678.7 mg
7.5	100		393.2 mg	1176.5 mg
8.0	100		161.8 mg	1531.7 mg
		borate	H <sub>3</sub> BO <sub>3</sub>	Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> * 10 H <sub>2</sub> O
8.0	100		534.8 mg	128.8 mg
8.5	100		387.8 mg	355.3 mg
9.0	100		98.8 mg	801.0 mg
			Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> * 10 H <sub>2</sub> O	0.1 M NaOH
9.5	100		618.3 mg	69.6 mL
10.0	100		618.3 mg	87.9 mL

Calculated for 100 mL of buffer

Figure S1

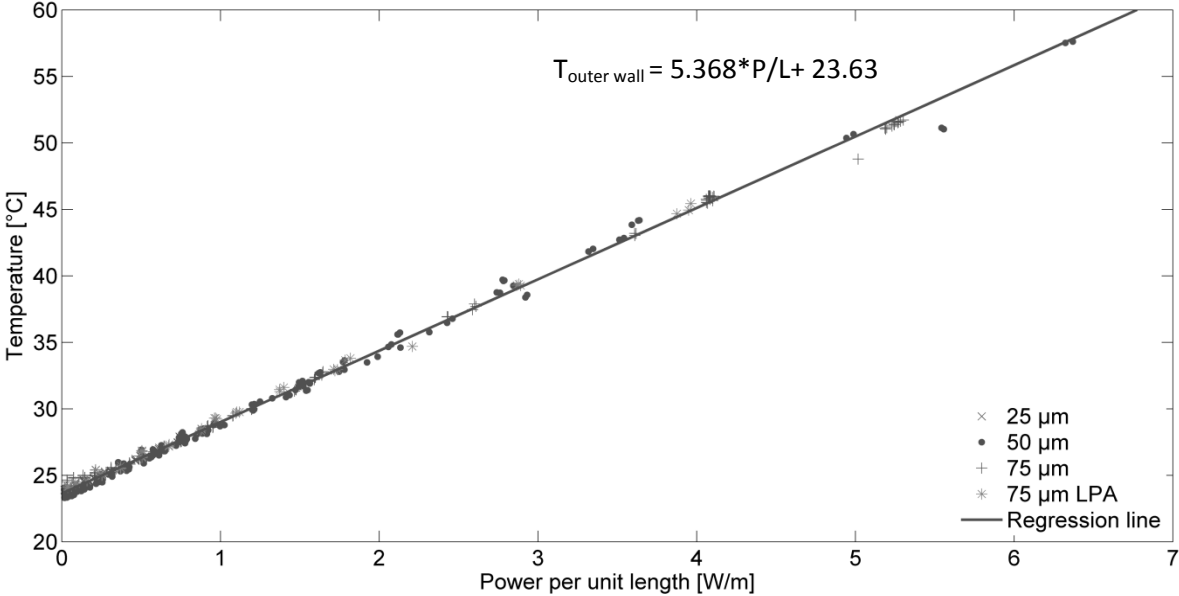


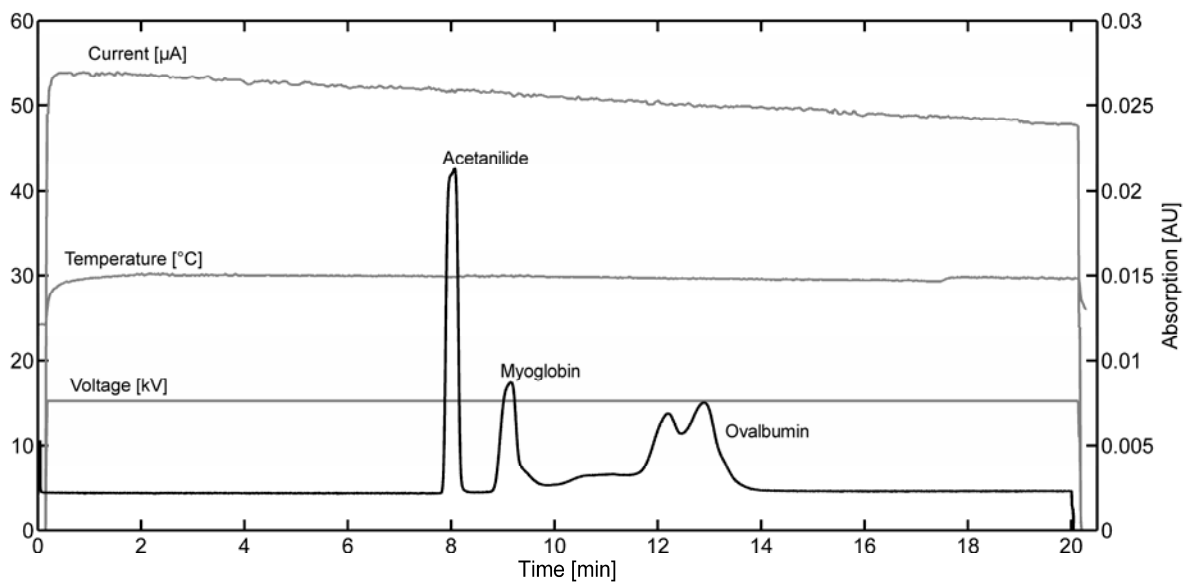
Diagram of the linear relationship between the electrical power and the temperatures measured by the IR thermometer at a distance to the capillary of 10 mm. The linearity is demonstrated over the range of 0-6 W m<sup>-1</sup> with n= 439 runs. For the experiments, different buffer systems and capillaries with various inner diameters were used. The quality of the linear regression over all capillary types is completely sufficient with a coefficient of determination of R<sup>2</sup>=0.997.

Figure S2:

Example separation performed with various voltages.

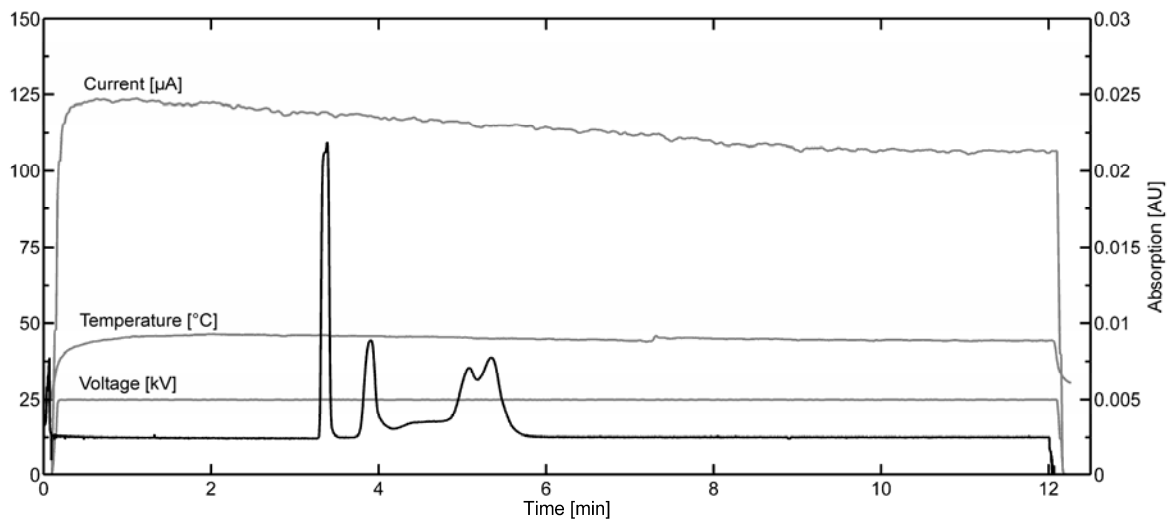
A mixture of acetanilide, myoglobin and ovalbumin was separated with a phosphate buffer ( $0.1 \text{ mol l}^{-1}$ , pH 8) at various voltages. In the diagrams, the left y-axis displays the values for current, temperature and voltage in their units  $\mu\text{A}$ ,  $^{\circ}\text{C}$  and  $\text{kV}$ , respectively. The absorption of the electropherogram is scaled at the right y-axis. Note that for the various voltages the separation time has to be adjusted. This leads to different scales of the x-axes in the diagrams. However, it is apparent that from a definite power per unit length and a respective temperature. The separation suffers, possibly the proteins even denature.

a) Separation at 15 kV



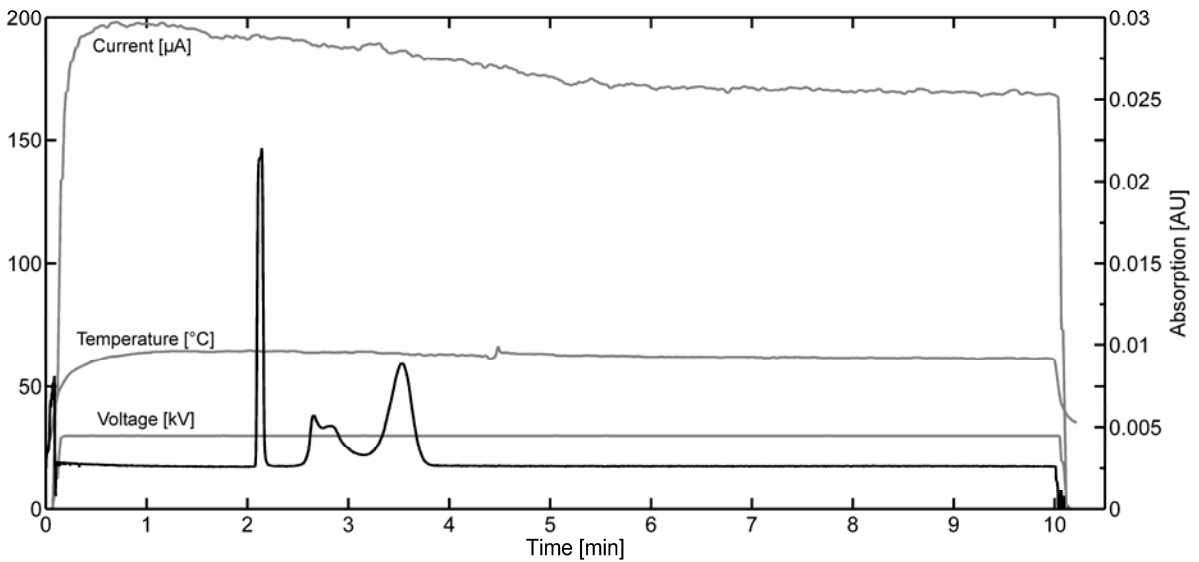
The voltage of 15 kV results in a power per unit length of  $0.92 \text{ W m}^{-1}$  and a temperature of  $29.8 \text{ }^{\circ}\text{C}$ .

b) Separation at 25 kV



The voltage of 25 kV results in a power per unit length of  $3.34 \text{ W m}^{-1}$  and a temperature of  $44.7 \text{ }^{\circ}\text{C}$ .

c) Separation at 30 kV



The voltage of 30 kV results in a power per unit length of  $6.31 \text{ W m}^{-1}$  and a temperature of  $62.2 \text{ }^{\circ}\text{C}$ . A notable change in the separation pattern is observed.