

## BEAN nomenclature

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### A. Notation conventions

We use the following nomenclature:

<i>Symbol</i>	<i>Quantity</i>	<i>Units</i>
$\mu$	electrophoretic mobility	$10^{-8} \text{ m}^2/(\text{V.s})$
$c$	molar concentration	millimolar (mM)

Subscripts indicate chemical species (e.g., the leading ion), and superscripts indicate the zone of interest (e.g., the leading electrolyte zone). Species type and zone abbreviations are listed in the tables below. For example,  $\mu_A^{ATE}$  and  $c_{LI}^{LE}$  refer to the effective mobility of the sample in the ATE region, and the concentration of the leading ion within the leading electrolyte zone.  $\mu_X^o$  denotes the fully ionized mobility of species  $X$ , and  $c_X^i$  denotes the initial concentration of species  $X$ , as specified in the user inputs. We also use these commonly defined notations:  $\text{pH} = -\log_{10} \frac{[H^+]}{c^o}$  where  $c^o = 1 \text{ M}$ , and  $\text{p}K_a = -\log_{10} K_a$ , where  $K_a$  is the acid dissociation constant.

### B. ITP zones

ITP zones are termed as follows:

<i>Abbreviation</i>	<i>Zone Name</i>
LE	Leading electrolyte
S	Sample region
ATE	Adjusted trailing electrolyte
TE	Trailing electrolyte

### C. Chemical species

Chemical species are indicated by the following:

<i>Abbreviation</i>	<i>Species Type</i>	<i>Species present within</i>	<i>Description of mobility for typical ITP</i>	<i>Charge for anionic ITP (for cationic ITP)</i>
LI	Leading ion	LE	High magnitude (relative to TI)	Negative (Positive)
CI	Counter-ion	LE, S, ATE, TE	Opposite sign of other species	Positive (Negative)

A	Analyte ion	S	Intermediate magnitude (relative to TI and LI)	Negative (Positive)
TI	Trailing ion	ATE, TE	Low magnitude (relative to A)	Negative (Positive)

#### D. ITP checks

We implemented three checks on mobility values to ensure that the ITP condition was satisfied. That is, we verify that the analyte would indeed be focused between the LE and ATE zones if the following conditions hold:

- LE zone condition is verified if  $\mu_{LI}^{LE} > \mu_A^{LE}$  and  $\mu_{LI}^{LE} > \mu_{TE}^{LE}$ ,
- Analyte zone condition is verified if  $\mu_{LI}^S > \mu_A^S$  and  $\mu_A^S > \mu_{TE}^S$ ,
- TE zone condition is verified if  $\mu_{LI}^{ATE} > \mu_{TE}^{ATE}$  and  $\mu_A^{ATE} > \mu_{TE}^{ATE}$ .