

*Supporting information (SI) for*

Precision and accuracy of highly-enriched double-spike Fe taggant  
measurements using Quadrupole- and Multicollector-ICP-MS

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### **Chemicals and Sample preparation.**

#### ***Chemicals:***

OPTIMA grade nitric acid (69%) is obtained from ThermoFisher Scientific. Water for general rinsing was 18  $\Omega$  deionized (DI) water while final rinses and water used for synthesis was UltraPure DNase/RNase-Free distilled water procured from ThermoFisher Scientific. The isotopically enriched iron (Fe) metal precursors were procured from Trace Sciences International; information on the assays and isotopic abundances are copied in Tables S1-S2. The iron (III) nitrate nonahydrate (99+% for analysis) was purchased from ThermoFisher Scientific; its assay is also in Table S2.

#### ***Further Experimental Details:***

All glassware used was pre-leached by refluxing with 8 M nitric acid and rinsing with ultrapure water. All FEP bottles were pre-rinsed with 8 M nitric acid and ultrapure water. Work was completed in a clean fumehood in which metal fixtures were wrapped in Al foil. The stirplate used was covered with fresh Al foil for each solution mixing.

All solutions were prepared gravimetrically whereby solution concentrations were based on a gram of Fe per gram of total solution basis. The masses used to produce each solution are presented in Scheme S1 below.

**Table S1:** Isotopic abundances of the Fe-54 and Fe-57 metal precursors.

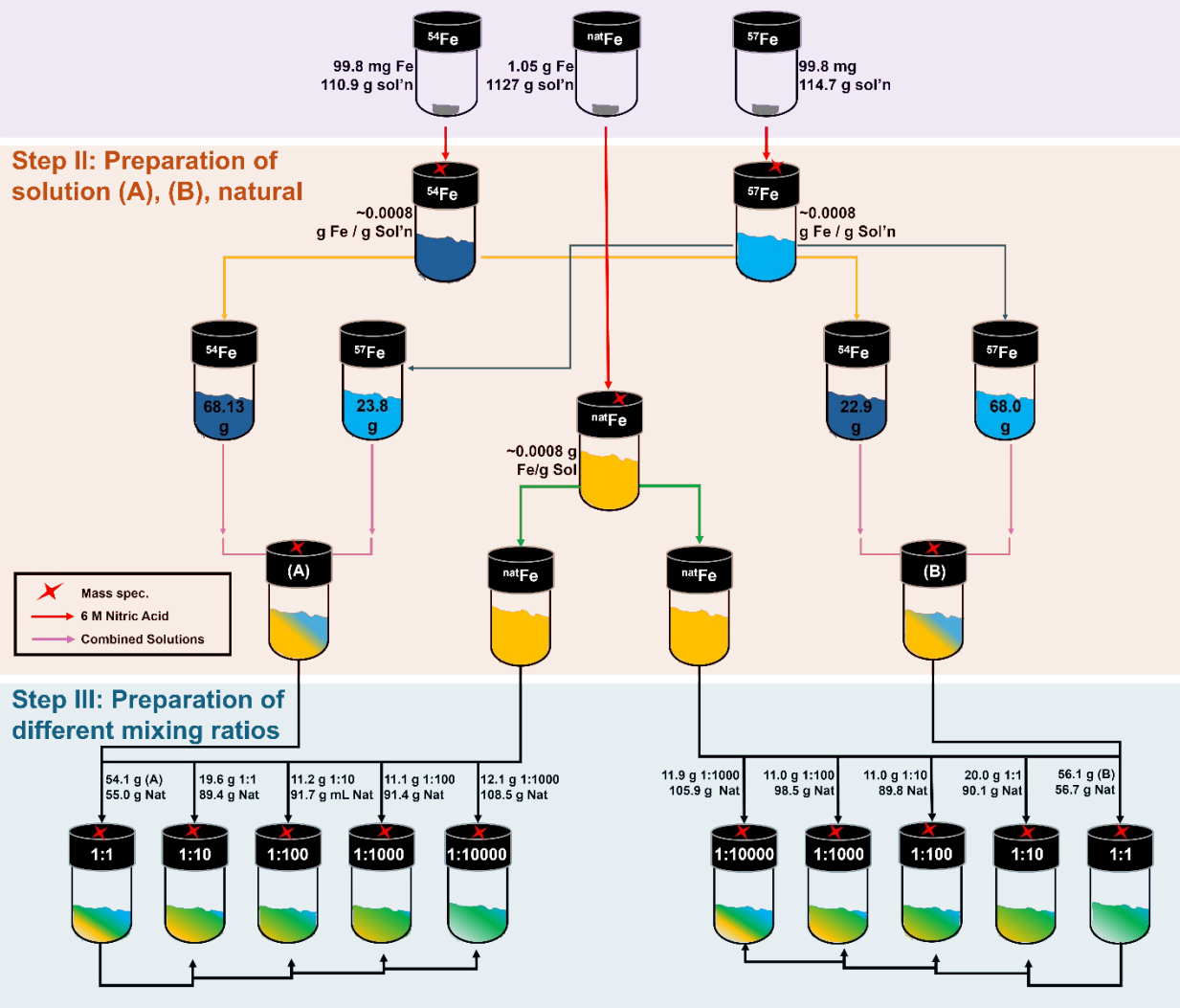
	<b>Isotope:</b>	<b>Atomic Percent (%)</b>	<b>Precision (<math>\pm</math>)</b>
<b>Fe-54</b>	Fe-54	97.60	0.02000
	Fe-56	2.35	0.07000
	Fe-57	0.04	0.08000
	Fe-58	0.01	0.00000
<b>Fe-57</b>	Fe-54	0.22	0.02000
	Fe-56	7.34	0.02000
	Fe-57	92.44	0.01000
	Fe-58	<0.05	0.00500

**Table S2:** Chemical assays of the isotopically enriched and natural Fe precursors.

Iron Precursor	Element	ppm
<b>Fe-54</b>	Al	30
	B	3
	Ca	3
	Cl	10
	Co	<1
	Cr	3
	Cu	5
	Fe	“major”
	K	5
	Mg	<1
	Mn	3
	Mo	3
	Na	30
	Ni	1
	P	1
	S	5
	Sc	<1
	Si	3
	Sr	1
	Ti	1
	V	<1
	Zn	5
	Zr	<1
<b>Fe-57</b>	B	20
	Fe	“major”
	Mn	10
<b>Natural-Abundance Fe</b>	Cl	<5
	SO <sub>4</sub>	<50
	Cu	1
	Zn	1
	Mn	2
	Pd	4
	Ca	2
	Na	2
	K	2
	As	<0.5

### Step I: Preparation of stock solutions

### Step II: Preparation of solution (A), (B), natural



**Scheme S1:** Synthesis Schematic for the iron alpha and beta series taggants.