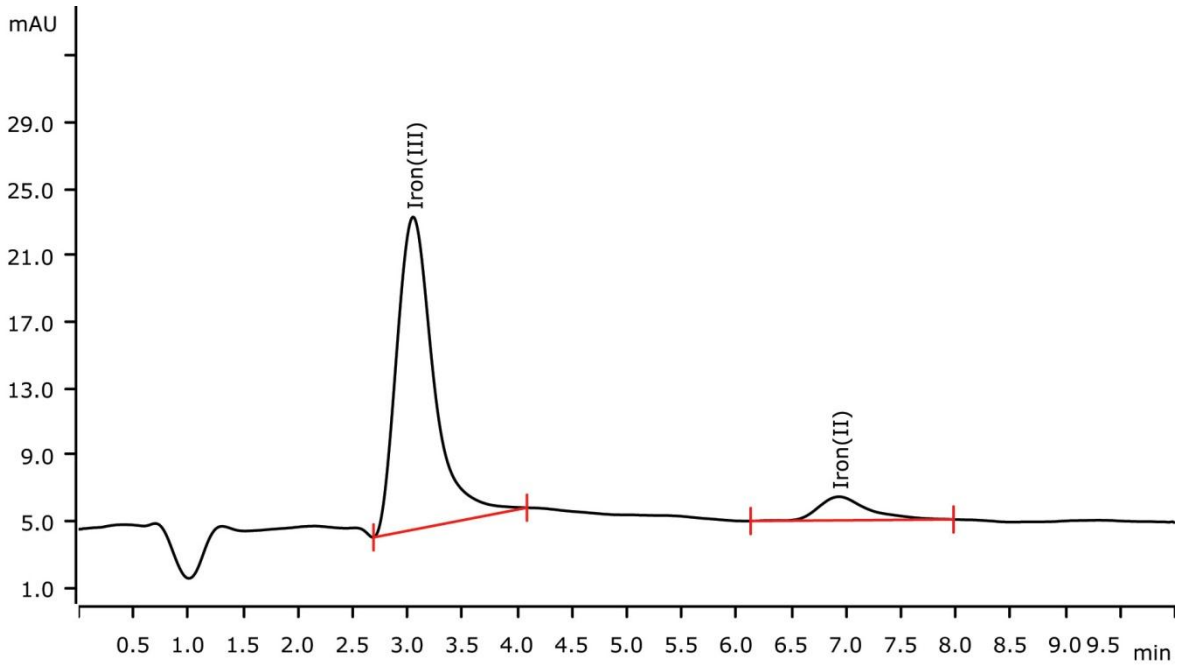
IC Application Note U–61

Speciation of iron(II) and iron(III) applying post-column reaction and subsequent UV/VIS detection



Speciation analysis is an important tool in analytical chemistry giving information about the quantitative distribution of different oxidation states of one and the same metal ion. The speciation of iron(II) and iron(III) (Fe^{2+}/Fe^{3+}) is achieved by ion chromatographic separation of their anionic dipicolinic acid complexes. Afterwards, post-column reaction with 4-(2-pyridylazo)resorcinol (PAR) allows VIS detection at 510 nm.

Results

	Concentration [µg/L]
Iron(III)	80
Iron(II)	40

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Sample

Standard solution

Sample preparation

None

Columns

Metrosep A Supp 10 - 75/4.0	6.1020.070
Metrosep A Supp 10 Guard/4.0	6.1020.500

Solutions

Eluent	7.0 mmol/L dipicolinic acid 5.6 mmol/L sodium sulfate 66 mmol/L sodium hydroxide 74 mmol/L formic acid pH = 4.3
PCR reagent	0.15 mmol/L PAR 4-(2-pyridylazo)resorcinol 80 mmol/L nitric acid 400 mmol/L ammonia

Parameters

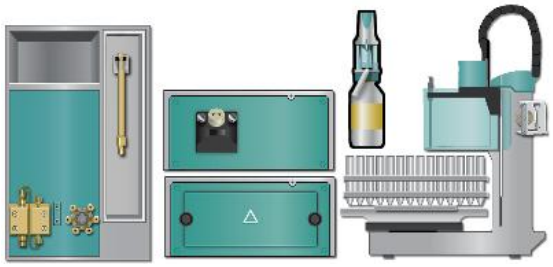
Flow rate	1.0 mL/min
Flow rate PCR	0.2 mL/min
Injection volume	100 µL
P_{max}	20 MPa
Recording time	10 min
Column temperature	45 °C
PCR temperature	45 °C
Light source (VIS)	Tungsten halogen lamp
Wavelength	510 nm
Reference	790 nm

Analysis

Visible detection after PCR

Instrumentation

881Compact IC pro – Cation	2.881.0010
858 Professional Sample Processor – Pump	2.858.0020
887 Professional UV/VIS Detector	2.887.0010
886 Professional Reactor	2.886.0110
800 Dosino	2.800.0020



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