Metal-free Columns for HPLC Part2

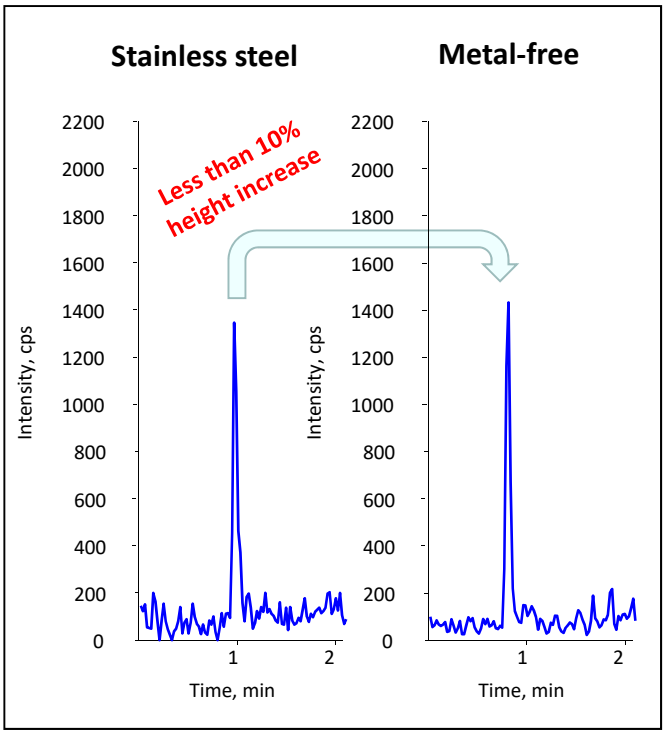
The advantages of metal-free columns are described in LT152 “Metal-free columns for HPLC Part1”. This technical note focuses on the packing inertness (e.g. residual metals) as a sequel to LT152.

(K.Kanno)

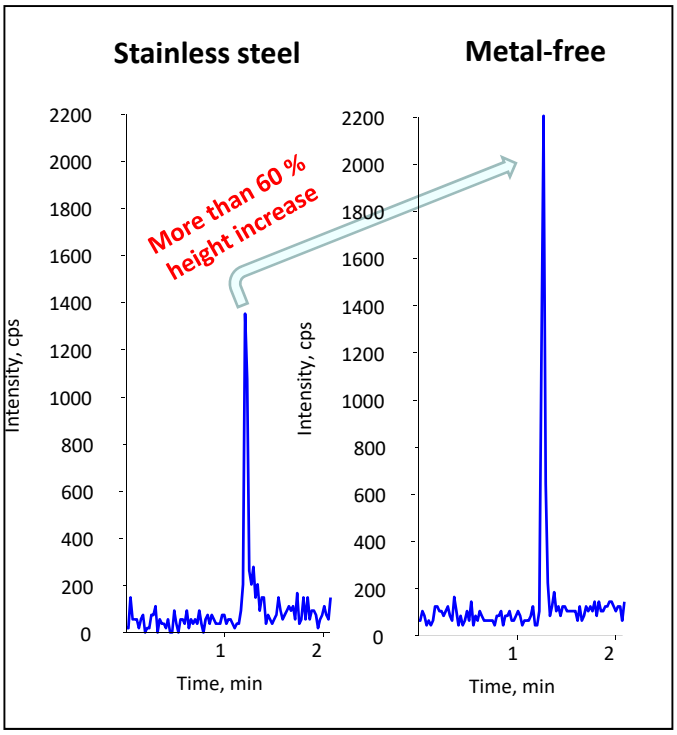
RP Example 1. Oxine copper

Oxine copper, a kind of pesticide, is a metal chelator and a better peak is expected to be obtained with a metal-free column. In the chromatograms below, two different packings are compared between stainless steel and metal-free columns. The highly inert packing increases the peak height more significantly, and the effects of metal-free columns are more pronounced.

Inertness
★★★
Brand-A Particle size : 2 mm



Inertness
★★★★★
InertSustain C18 Particle size : 2 mm



Conditions

Column : ODS columns (2 µm, 50 x 2.1 mm I.D.)

Mobile phase : A) 0.1 % HCOOH in CH_3CN

B) 0.1 % HCOOH in H_2O

A/B = 5/95 – 5 min – 100/0 , v/v

Flow rate : 0.4 mL/min

Temperature : 40 ℃

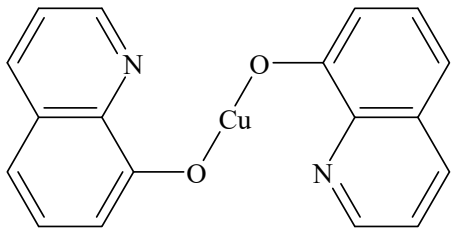
Detection : LC/MS/MS (ESI, Positive, MRM)

Injection volume : 5 mL

Analyte :	Q1	Q3
1. Oxine copper	146	128

Concentration : 2.0 mg/L

1. Oxine cupper



Structures are created using Chemistry 4-D Draw which is provided by ChemInnovation Software, Inc.

*Special inertization was carried out for the metal wetted parts of the HPLC systems used for this technical note. Please contact for details.

GL Sciences

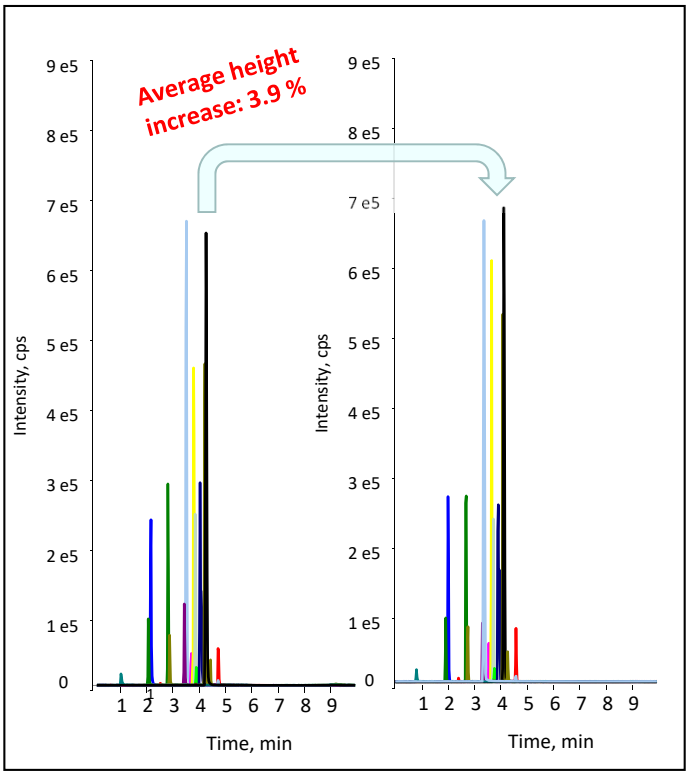
RP Example 2. Pesticides

Inertness of the packing and the column material is compared in analysis of 17 pesticides. The differences in the peak heights are smaller than the case of RP Example 1. Oxine copper, however, the more highly inert columns generally yield higher peak heights. Even for analysis of compounds not categorized as metal chelators, a more highly inert packing can highlight the effects of metal-free columns.

Inertness

★★★

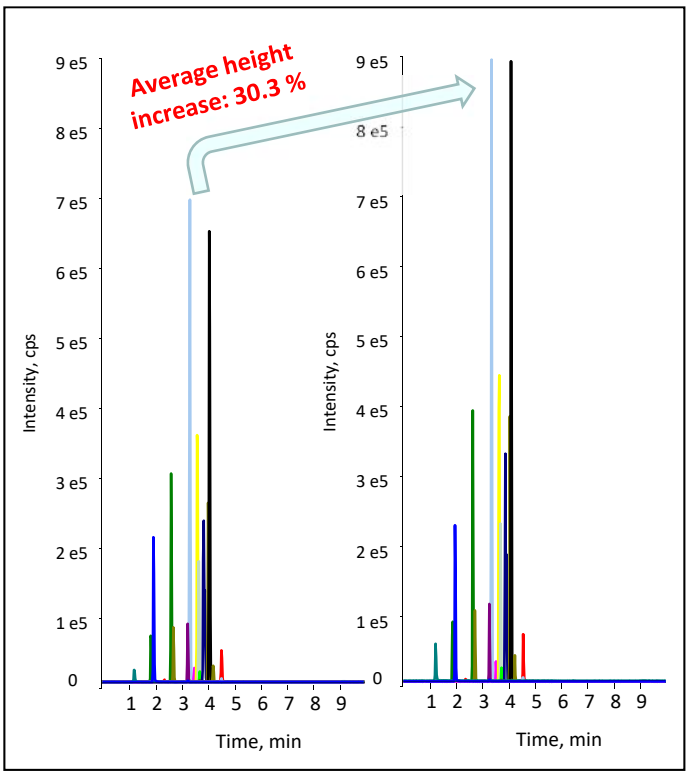
Brand-A Particle size : 2 mm



Inertness

★★★★★

InertSustain C18 Particle size : 2 mm



Conditions

Column : ODS columns (2 µm, 50 x 2.1 mm I.D.)

Mobile phase : A) 0.1 % HCOOH in CH_3CN

B) 0.1 % HCOOH in H_2O

A/B = 5/95 – 5 min – 100/0 – 3 min , v/v

Flow rate : 0.4 mL/min

Temperature : 40 ℃

Detection : LC/MS/MS (ESI, Positive, MRM)

CUR	CAD	IS	TEM	GS1	GS2
10	7	5500	500	80	80

Injection volume : 5.0 mL

Concentration : 20 mg/L each

	Q1	Q3	DP	CE
1. Oxine Copper	146	128	80	34
2. Asulam	231	156	61	17
3. Methomyl	163	88	41	13
4. Tricyclazole	190	163	76	33
5. MPP oxon sulfone	295	217	60	20
6. Thiodicarb	355	88	56	33
7. Carbofuran	222	165	50	19
8. Thiuram	241	88	60	20
9. MPP oxon	263	231	60	20
10. Bensulfuron methyl	411	149	71	29
11. Flazasulfuron	408	182	60	20
12. Siduron	233	137	81	23
13. Azoxystrobin	404	372	65	19
14. Dymron	269	151	64	20
15. Iprodione	330	245	61	21
16. Bensulide	398	314	71	17
17. Carpropamid	334	139	66	27

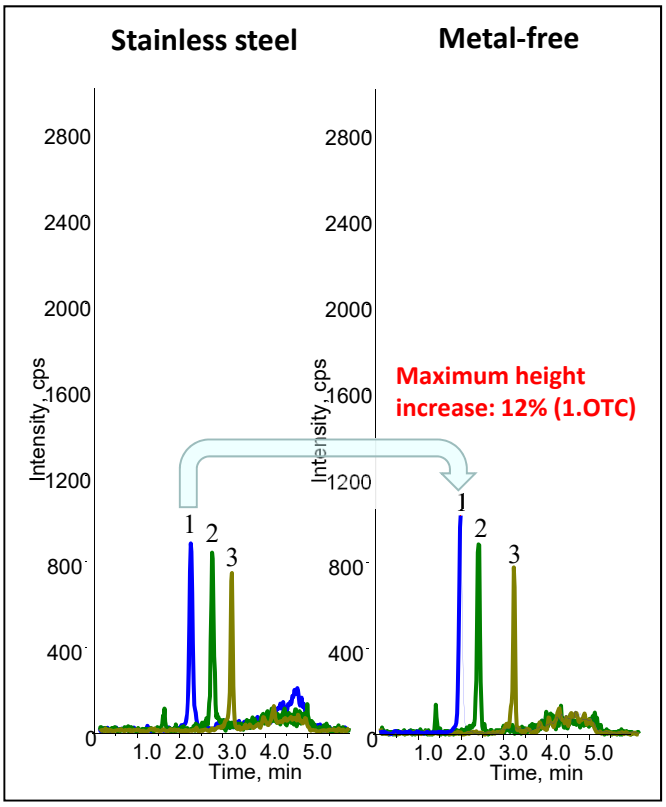
As shown in LT152, tetracyclines easily adsorb onto residual metals on the packing surface or metal parts of the column by chelation, and this adsorption has a bad influence on the analysis. Like RP Example 1. Oxine copper, the less residual metals are on the packing, the more significantly the peak heights increase. In the analysis of metal chelators, not only the column material but also the inertness of the packing are important.

1. Oxytetracycline
2. Tetracycline
3. Chlortetracycline

Inertness

★★★

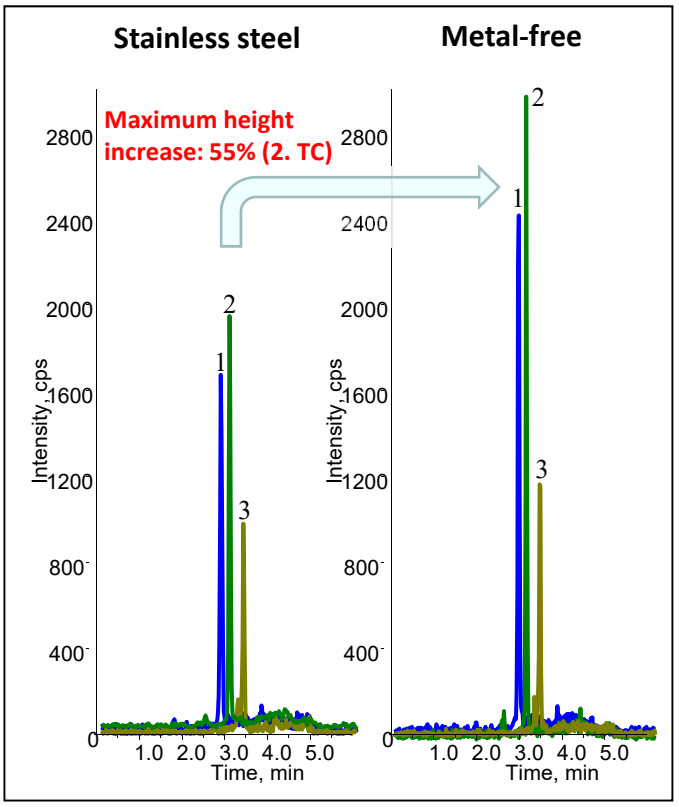
Brand-A Particle size : 2 mm



Inertness

★★★★★

InertSustain C18 Particle size : 2 mm



Conditions

Column : ODS columns (2 µm, 50 x 2.1 mm I.D.)

Mobile phase : A) 0.1 % HCOOH in CH_3CN

B) 0.1 % HCOOH in H_2O

A/B = 10/90 – 1 min – 10/90 – 3 min – 90/10 , v/v

Flow rate : 0.4 mL/min

Temperature : 40 ℃

Detection : LC/MS/MS (ESI, Positive, MRM)

CUR	CAD	IS	TEM	GS1	GS2
10	7	5500	700	80	80

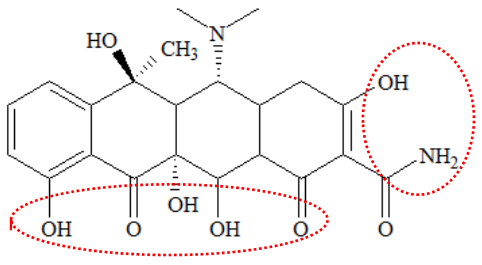
Injection volume : 10 mL

Analyte :

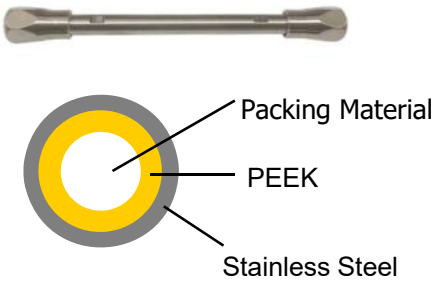
	Q1	Q3	
1. Oxytetracycline(OTC)	460	426	
2. Tetracycline(TC)		445	410
3. Chlortetracycline(CTC)	479	444	

*Conditions are partly different from those of tetracycline analysis in LT152.

2. Tetracycline



Structures are created using Chemistry 4-D Draw which is provided by ChemInnovation Software, Inc.



UHPLC-PEEK Columns

PEEK Columns

Analytical Columns List

InertSustain Series

- InertSustain C18
- InertSustainSwift C18
- InertSustain AQ-C18
- InertSustain C8
- InertSustain NH2
- InertSustain Phenylhexyl
- InertSustain Phenyl

Inertsil Series

- Inertsil ODS-4
- Inertsil ODS-3
- Inertsil ODS-SP
- Inertsil ODS-P
- Inertsil ODS-EP
- Inertsil C8-4
- Inertsil C8-3
- Inertsil Ph-3
- Inertsil WP300 C18
- Inertsil WP300 C8
- Inertsil WP300 C4
- Inertsil Peptides C18
- Inertsil HILIC
- Inertsil Amide
- Inertsil Diol
- Inertsil NH2
- Inertsil WP300 Diol
- Inertsil SIL-100A
- Inertsil WP300 SIL
- Inertsil CN-3

*Other packing materials are on request.
*Check https://www.glsciences.com/product/lc_columns/01853.html for details.

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