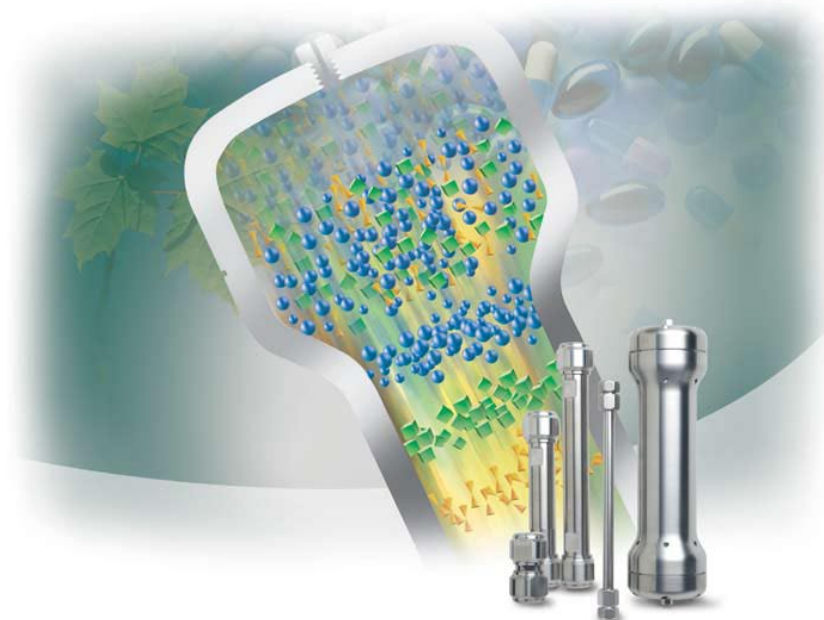


Extreme Resolution on Very High Carbon-Loaded HPLC phases

-Pursuit® XRs-



- Short run times
 - But not too short or risk poor separation
 - Of course for MS detection less a problem, although chromatographic and MS requirements aren't the same, e.g. TFA or ion pairing reagents help LC, but hurt MS

Why so many columns?

When changes to temperature and mobile phase are insufficient to resolve components...

- Select a different column
 - Column length/particle size
 - Stationary phase

- Specific surface area
- Pore diameter
- %C
- Phase density

These parameters influence retention, efficiency and selectivity for a certain component and thus Resolution.

- Newest addition to Varian Pursuit family
- Made of 100Å high purity silica
- **Extremely high surface area silica gel (~440 m²/g)**
- **High carbon content (Pursuit XRs C18: ~ 24.4% carbon)**
- Exceptional ruggedness in ballistic gradient environments
- Operate in wide pH range – 1.5 to 10.0
- Available in 3 and 5 and 10 µm particle sizes
- Ligands offered – C18, C8, and Diphenyl*;
ligand coverage C18 = 3.23 µmol/m²

- Diphenyl pH range is 1.5 to 7.5



Bonded Phase	Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Carbon Load (%)	Phase Density (µmole/m ²)	Endcapped	pH range
Pursuit XRs C18	5	100	440	24.4	3.23	Yes	1.5-10.0
Pursuit XRs C8	5	100	440	15.1	3.49	Yes	1.5-10.0
Pursuit XRs DP	5	100	440	14.3	2.42	Yes	1.5-7.0
Column „I“, C18	5	100	450	15.0	1.23	Yes	2.0-7.5
Column „L“, C18	5	100	400	17.5	3.00	Yes	1.5-10.0
Column „S“, C18	5	100	350	16.1	3.45	Yes	1.0-?

Specifications of competitive phases were obtained from literature published by manufacturer

High carbon load:

- Interaction with C18 groups and not silica.

Low ligand buffering:

- Small change in pH gives a favored interaction with silica. Result: less reproducible retentions.

Result of high ligand buffering (Pursuit XRs):

- Significantly improved reproducibility.

Both carbon load and specific surface area are maximized:

- Results in maximized Rs.

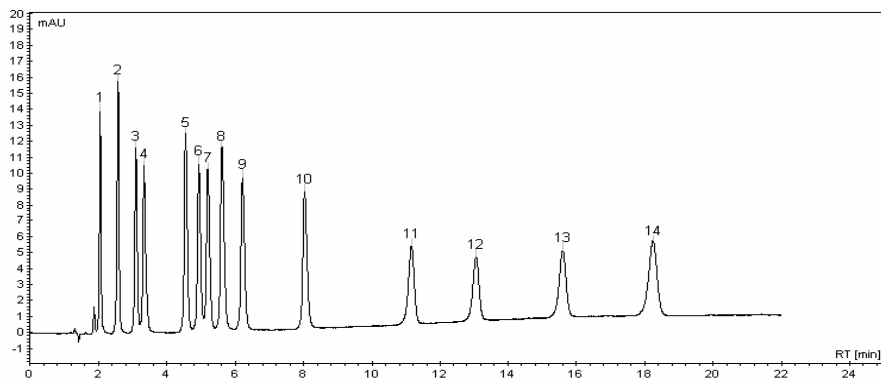
High carbon load ensures more interactions between analyte and bonded phase:

- Greater selectivity and retention leads to higher Rs.

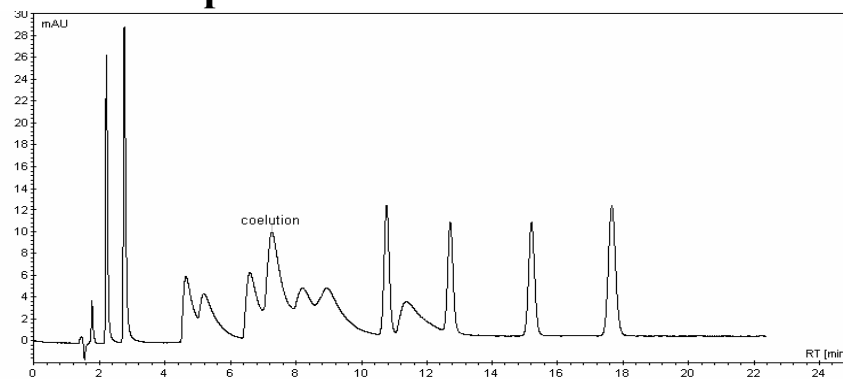
Higher resolution:

- Faster method development and validation of new methods.

Pursuit XRs C18



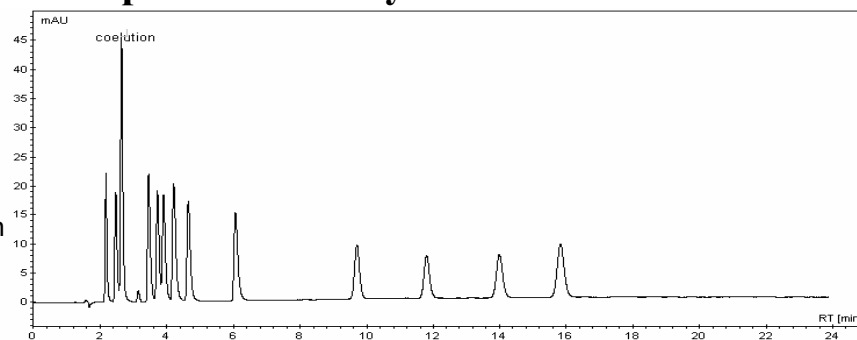
Competitive C18



TCAs and Benzos mix on Pursuit XRs C18 and others

Dimensions: 150 x 4.6 mm, 5 μ (all columns)
 Mobile Phase: A: H₂O + 0.1% HCOOH, B: CH₃CN + 0.1% HCOOH
 Gradient: 30% - 40% B in 15 mins, hold at 40% B for 15 mins
 Flow Rate: 1.0 ml/min
 Temperature: Ambient
 Detection: 254 nm
 Sample: 1. 7-Aminoclonazepam 2. 7-Aminoflunitrazepam 3. Nordoxepin
 4. Doxepin 5. Desipramine 6. Imipramine 7. Nortriptyline 8. Amitriptyline 9.
 Trimipramine 10. Clomipramine 11. Nordiazepam 12. Clonazepam 13.
 Flunitrazepam 14. Diazepam

Competitive C18 Hybrid Particle



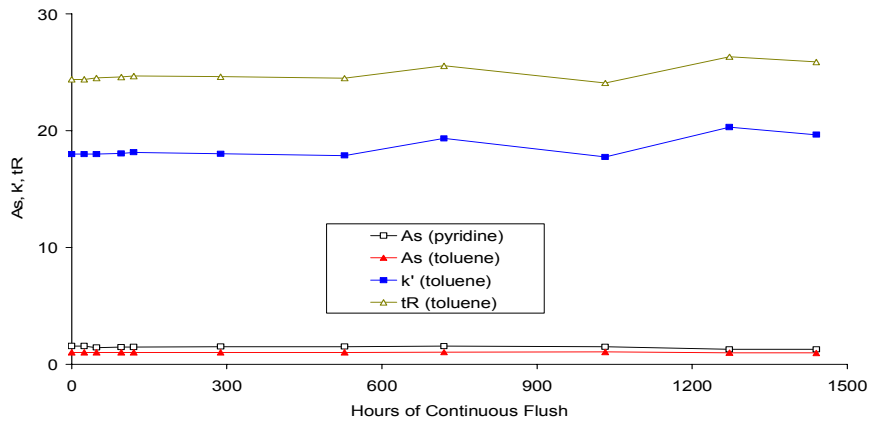


Excellent pH stability

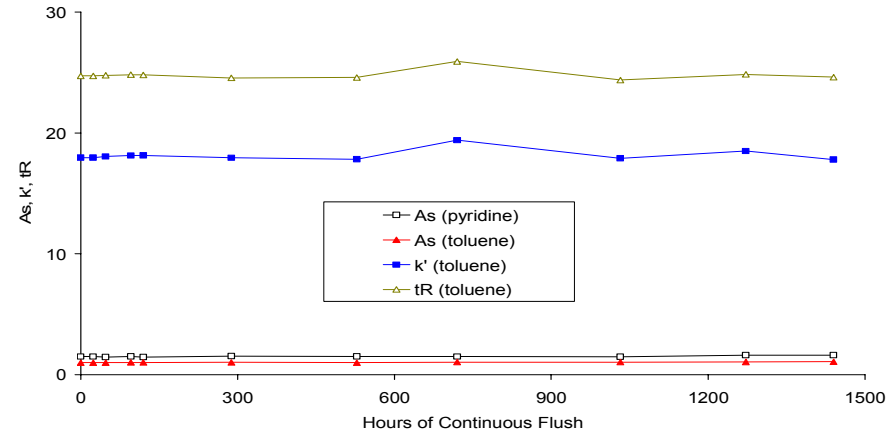
C18 and C8 phases

Pursuit XRs C18 and C8 phases are pH stable from 1.5 to 10.0 for over 1,440 hours under continuous flush environments.

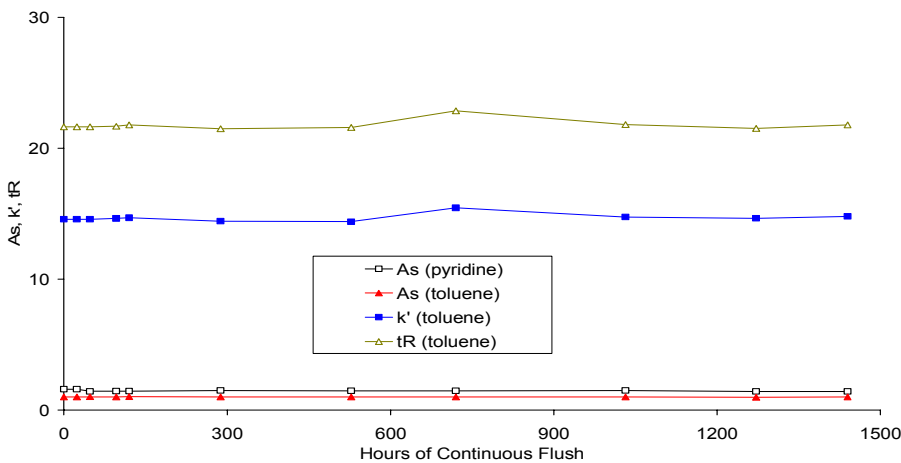
Stability of Pursuit XRs C18 at pH 1.5



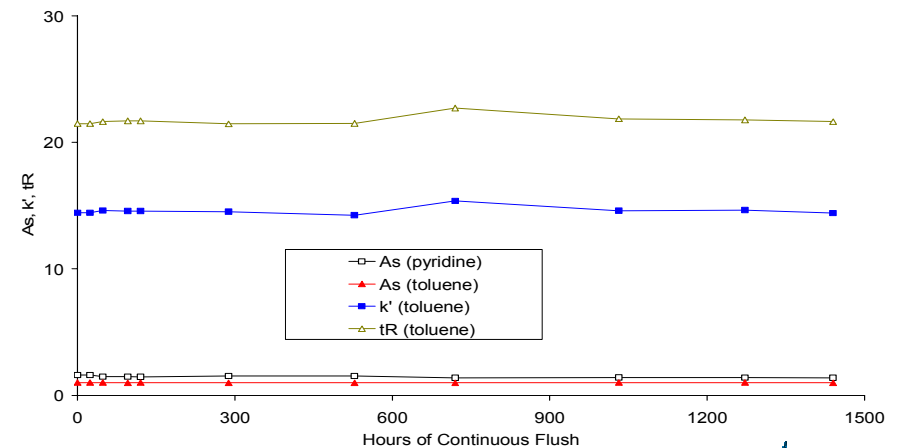
Stability of Pursuit XRs C18 at pH 10.0



Stability of Pursuit XRs C8 at pH 1.5



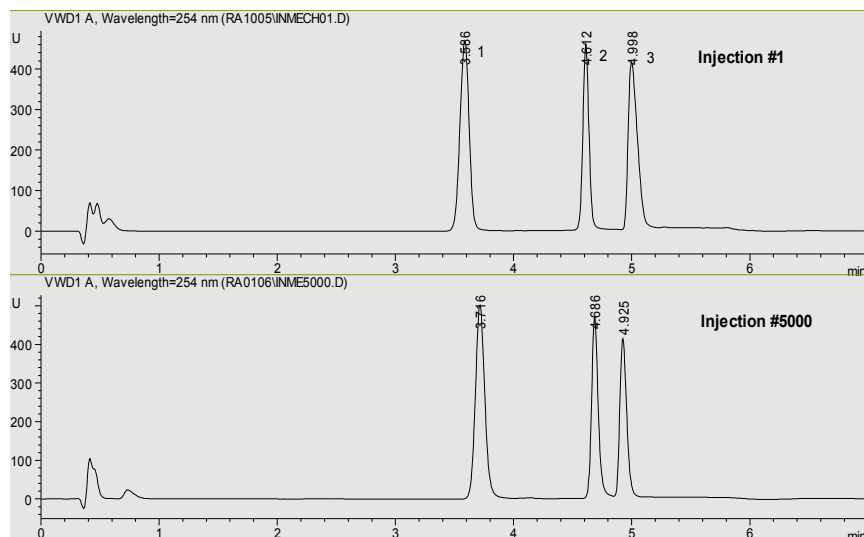
Stability of Pursuit XRs C8 at pH 10.0





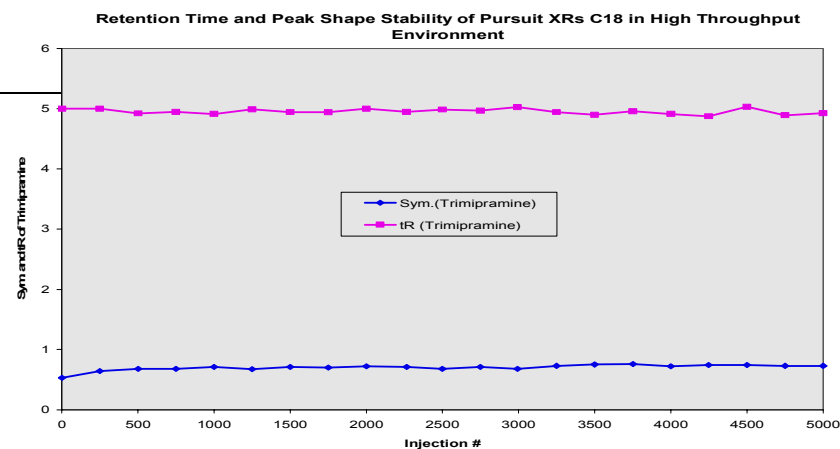
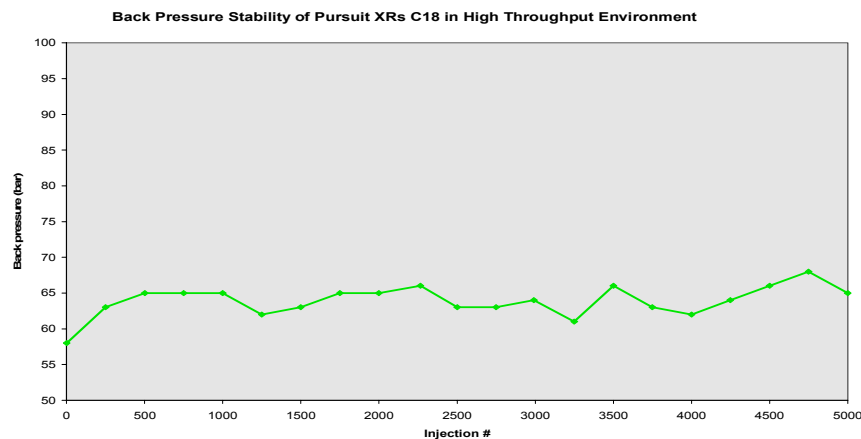
Excellent column life

Exceptional mechanical stability in ballistic gradient environments



Mechanical Stability of Pursuit XR8 C18 in a High Throughput Environment

Column: Pursuit XR8 C18
Dimensions: 50 x 2.0 mm, 5 μ
Mobile Phase: A: CH₃OH:H₂O - 10:90 + 0.1% HCOOH, B: CH₃OH:H₂O - 90:10 + 0.1% HCOOH, Gradient: 0% - 100% B in 3 mins, back to 0% B in 0.5 mins, stay at 0% B for 3.5 mins
Flow Rate: 0.4 ml/min; Temperature: Ambient; Detection: 254 nm
Sample: DMSO mix containing
1. 4-Methoxybenzenesulfonamide
2. Methyl 3-aminothiophene-2-carboxylate
3. Trimipramine

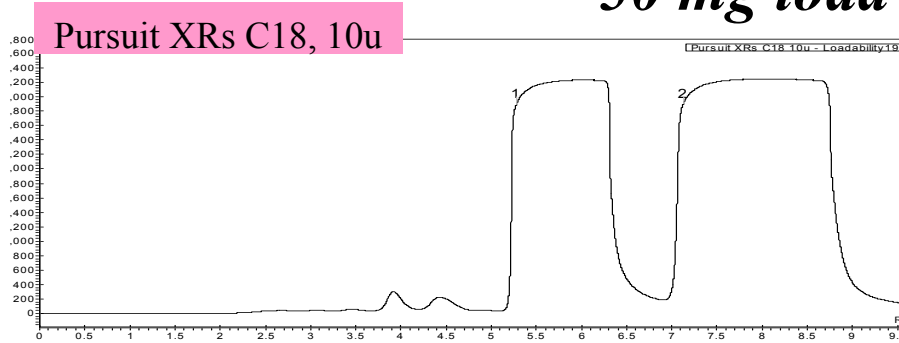




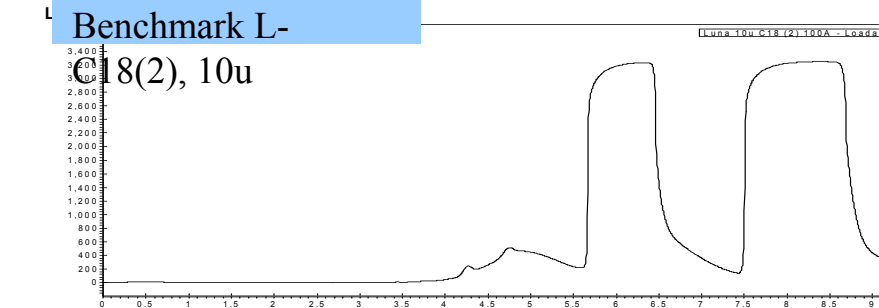
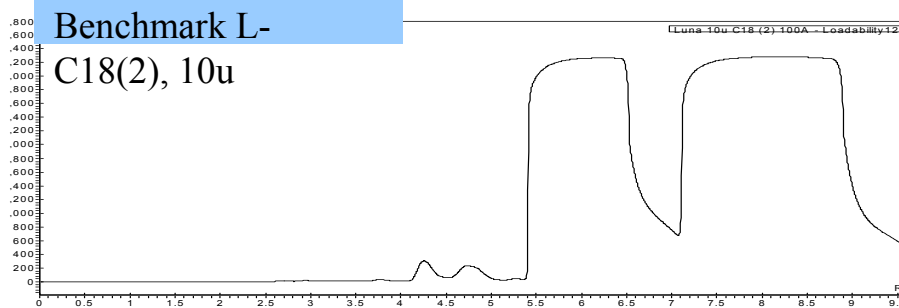
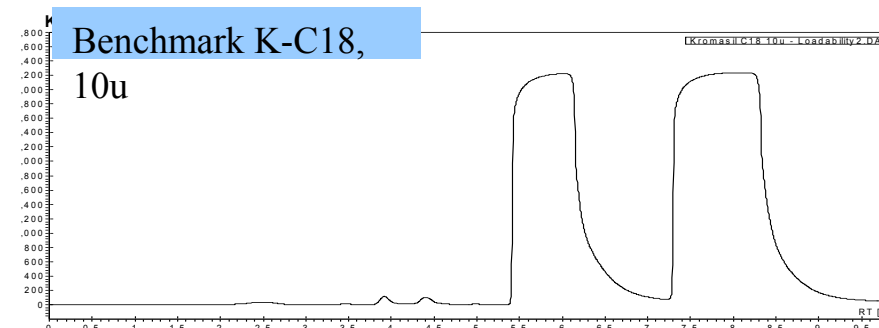
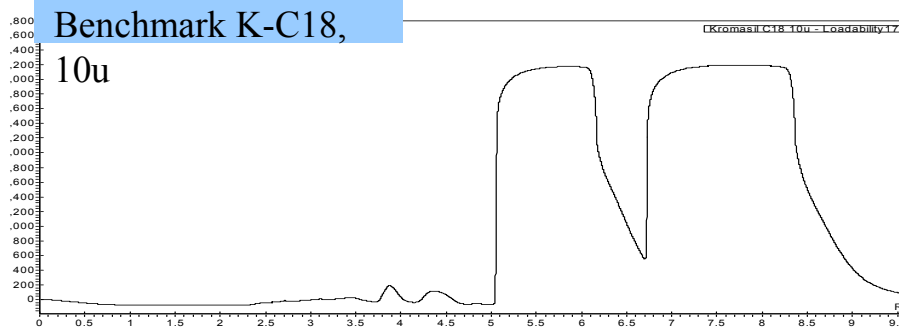
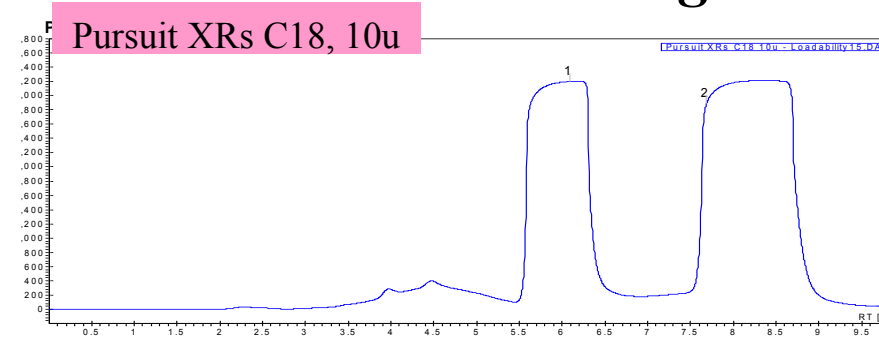
Pursuit® XRs

Correlation vs. Benchmark Loadability vs. Resolution

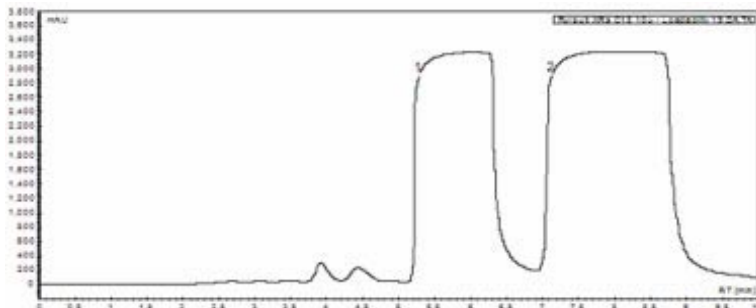
50 mg load



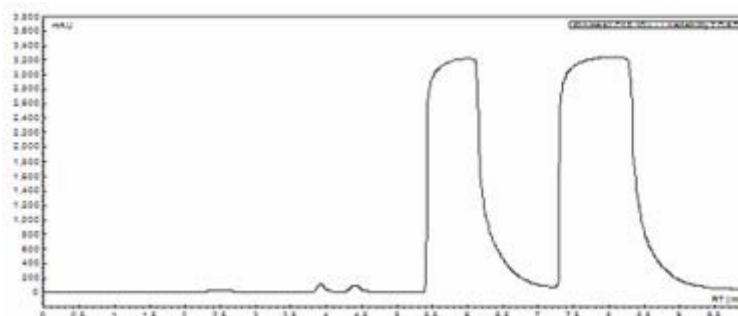
20 mg load



Pursuit XRs - 50mg



Competitor A - 20mg

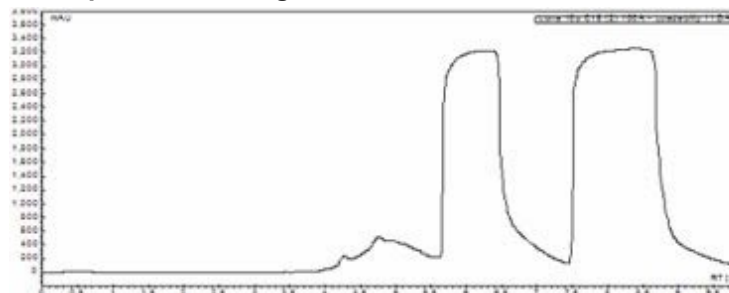


2.5 times higher mass load!

Dimensions: 250 x 4.6mm, 10 μ
Mobile Phase: CH₃ OH : H₂O – 70:30
Flow Rate: 1.0 mL/min
Temperature: 30°C
Detection: UV 254

Sample: 1. Methyl benzoate, 2. Ethyl benzoate

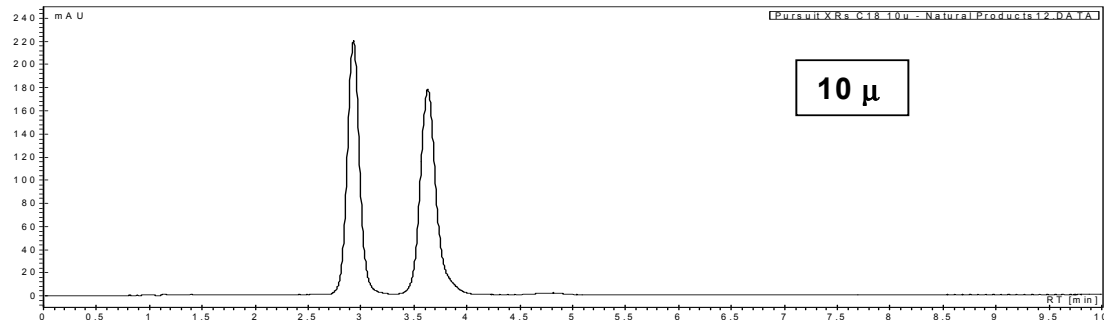
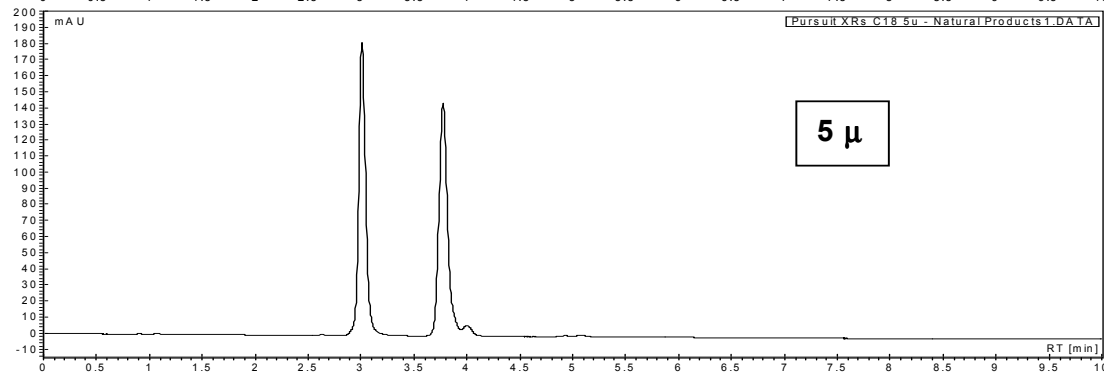
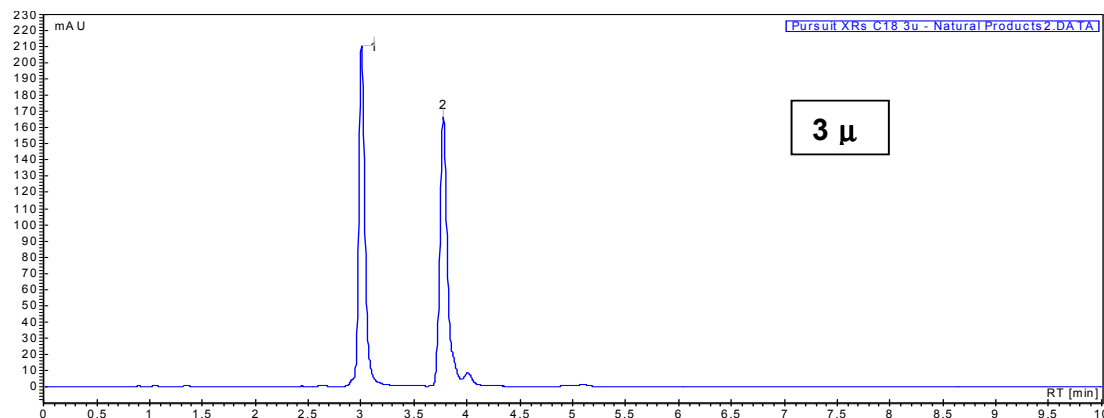
Competitor B - 20mg



	Pursuit XRs	Competitor A	Competitor B
Loadability (mg)	50	20	20
Rs	2.10	1.72	1.48
Selectivity	1.35	1.23	1.21
As ethylbenzoate	5.09	6.67	6.64



Scaling-up Pursuit® XR_s C18 – 3, 5, and 10-micron



Natural Products – Capsaicin and Dihydrocapsaicin

Column: Pursuit XR_s C18

Dimension: 150 x 4.6mm

Mobile Phase: CH₃CN / H₂O
(70/30)

Flow rate: 1mL/min

Temperature: Ambient

Detection: UV 220nm

Sample: 1. Capsaicin;

2. Dihydrocapsaicin



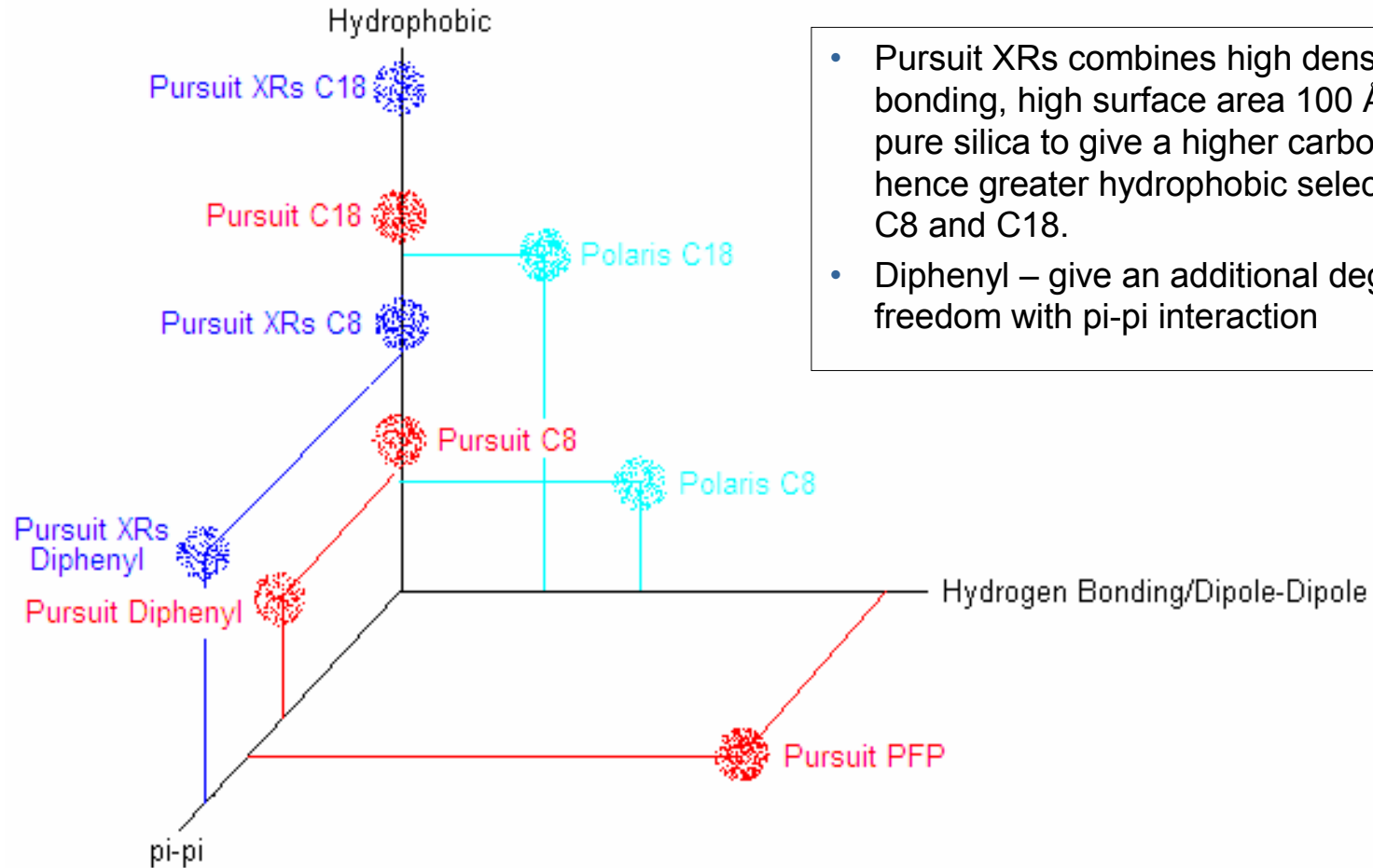
Pursuit XRs delivers:

- Excellent resolution of complex mixtures of compounds.
- Faster method development.
- Reproducible results.
- Long column lifetime evaluated over 5000 injections.
- Wide pH stability.
- Maximum loadability.

Choose the right Pursuit XRs column

	Retention mechanism	Compounds
C18	Hydrophobic interaction	Compounds where maximum resolution is needed Application examples – β-blockers, Antidepressants
C8	Hydrophobic interaction, but less compared to C18	Lower hydrophobicity compounds, positional isomers Application examples – Pesticides, Herbicides, Phenols, Anesthetics
Diphenyl	Interaction of pi electrons in DP group with electron deficient functional groups of solute molecules	Compounds with aromatic rings Application examples – Analgesics, Antimicrobials

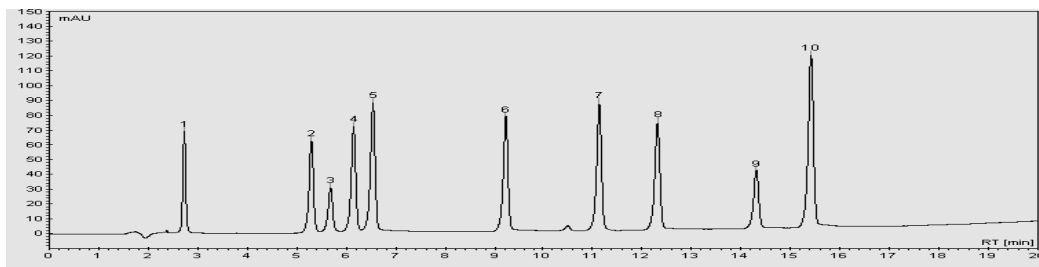
Separation properties of Pursuit® XRs



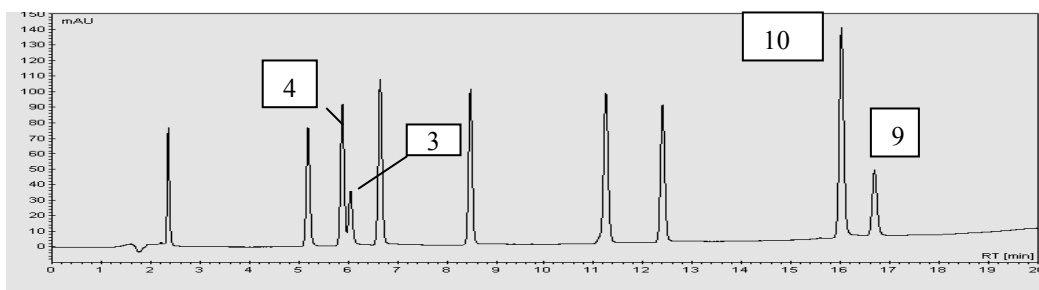
- Pursuit XRs combines high density bonding, high surface area 100 Å ultra pure silica to give a higher carbon load hence greater hydrophobic selectivity with C8 and C18.
- Diphenyl – give an additional degree of freedom with pi-pi interaction

Analytes can be separated on Pursuit XRs C18 and C8 phases based on pure hydrophobic interactions, or they can also exploit the pi-pi retention mechanism of Pursuit XRs DP and observe increased resolution and selectivity switch on some critical pairs, such as salicylic acid and acetylsalicylic acid in the example below.

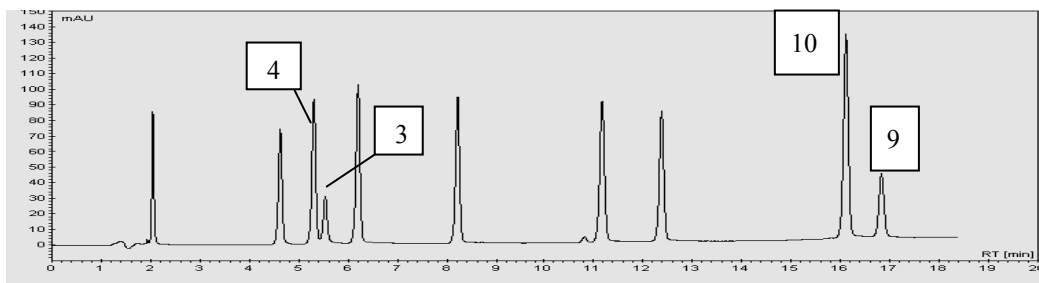
Pursuit XRs DP



Pursuit XRs C8



Pursuit XRs C18



Analgesics on Pursuit XRs DP, C8, and C18

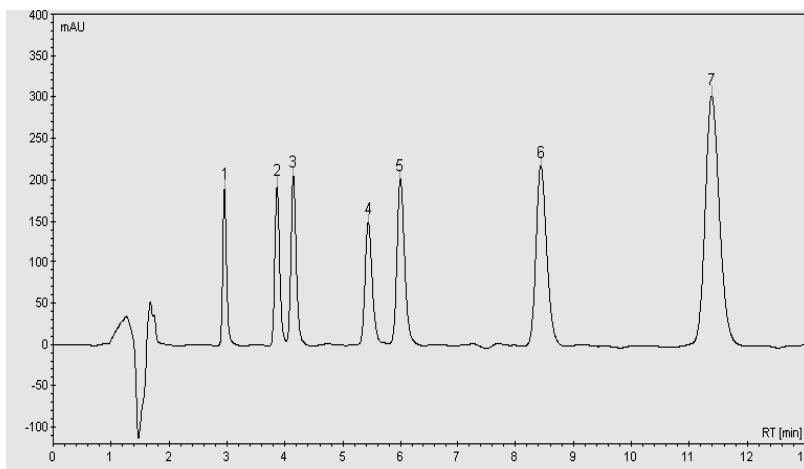
Columns:	Listed on chromatogram
Dimensions:	150 x 4.6 mm, 5 μ (all columns)
Mobile Phase:	A: H ₂ O + 0.1% HCOOH, B: CH ₃ CN + 0.1% HCOOH
	Gradient: 25% - 80% B in 20 mins
Flow Rate:	1.0 ml/min
Temperature:	Ambient
Detection:	254 nm
Sample:	1. Acetaminophen 2. Acetanilide 3. Salicylic acid 4. Acetylsalicylic acid (Aspirin) 5. Phenacetin 6. Carbamazepine 7. Tolmetin 8. Naproxen 9. Ibuprofen 10. Diclofenac



Best column to resolve positional isomers

Phenoxyacid herbicides and caffeine metabolites on Pursuit XRs C8

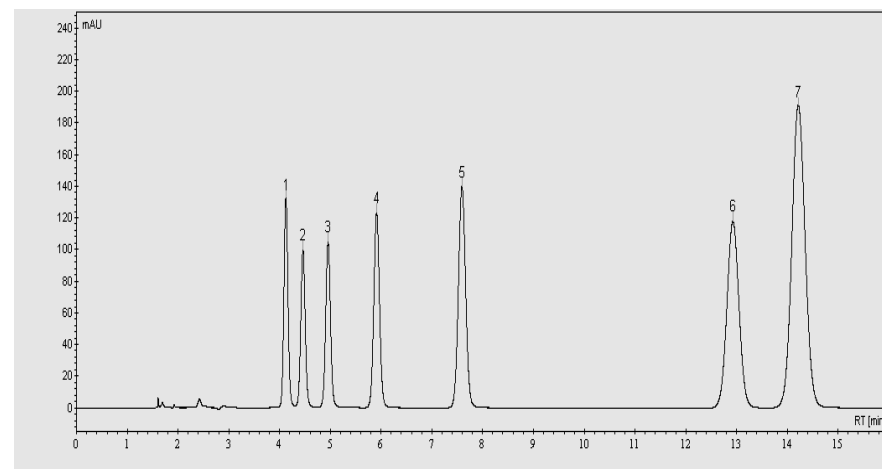
Phenoxyacid Herbicides



Separation with two pairs of Positional Isomers

Column:	Pursuit XRs C8
Dimensions:	150 x 4.6 mm, 5 μ
Mobile Phase:	CH ₃ CN: H ₂ O + 0.1% HCOOH - 50:50
Flow Rate:	1.0 ml/min
Temperature:	Ambient
Detection:	220 nm
Sample:	1. Phenoxyacetic acid 2. o-Chlorophenoxyacetic acid 3. p-Chlorophenoxyacetic acid 4. 2,3-Dichlorophenoxyacetic acid 5. 2,4-Dichlorophenoxyacetic acid 6. 2,4,5-Trichlorophenoxyacetic acid 7. 2,4,5-Trichlorophenoxypropionic acid (Silvex®)

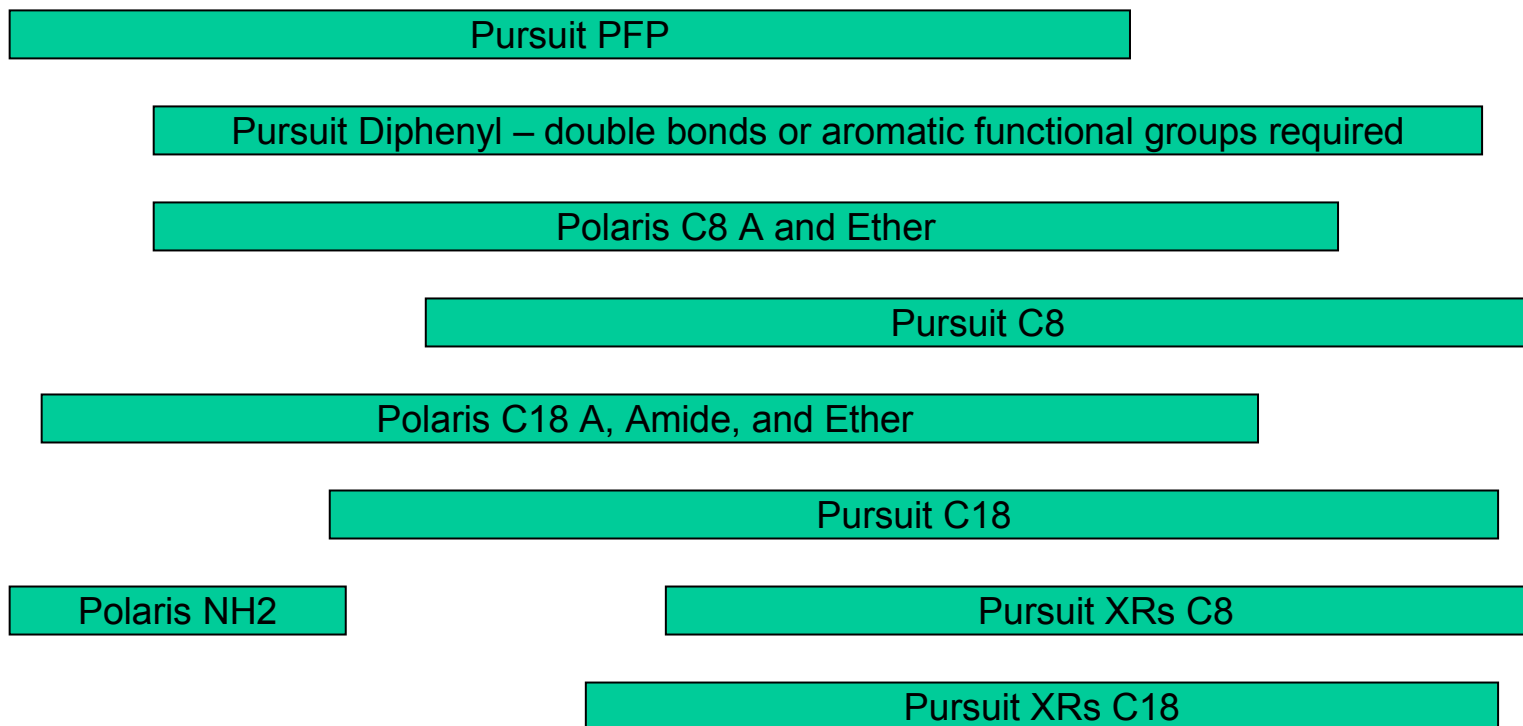
Caffeine Metabolites



Separation showing two sets of Positional Isomers

Column:	Pursuit XRs C8
Dimensions:	150 x 4.6 mm, 5 μ
Mobile Phase:	CH ₃ OH: 1% CH ₃ COOH in H ₂ O - 10:90
Flow Rate:	1.0 ml/min
Temperature:	Ambient
Detection:	254 nm
Sample:	1. 7-Methylxanthine 2. 1-Methyluric acid 3. 3-Methylxanthine 4. 1-Methylxanthine 5. 3,7-Dimethylxanthine 6. 1,7-Dimethylxanthine 7. 1,3-Dimethylxanthine

How to select the right Pursuit Column?



Very Polar

Polar

Moderately Polar

Non Polar

Pursuit family



```
graph TD; A[Pursuit family] --> B[Pursuit]; A --> C[Pursuit XRs]
```

Pursuit

Positioned for LC/MS and other high throughput applications

Built on the larger 200Å pore size silica, high ligand density delivers up to 40% faster separations without sacrificing resolution. This is accomplished by optimizing mass transfer with the larger pore

Pursuit XRs

Positioned for performance in R&D, QC and Prep applications.

Combining the high ligand density with a smaller 100Å, high surface area silica gives maximum loadability and method robustness/reliability. This is due to the extremely high carbonload on the surface