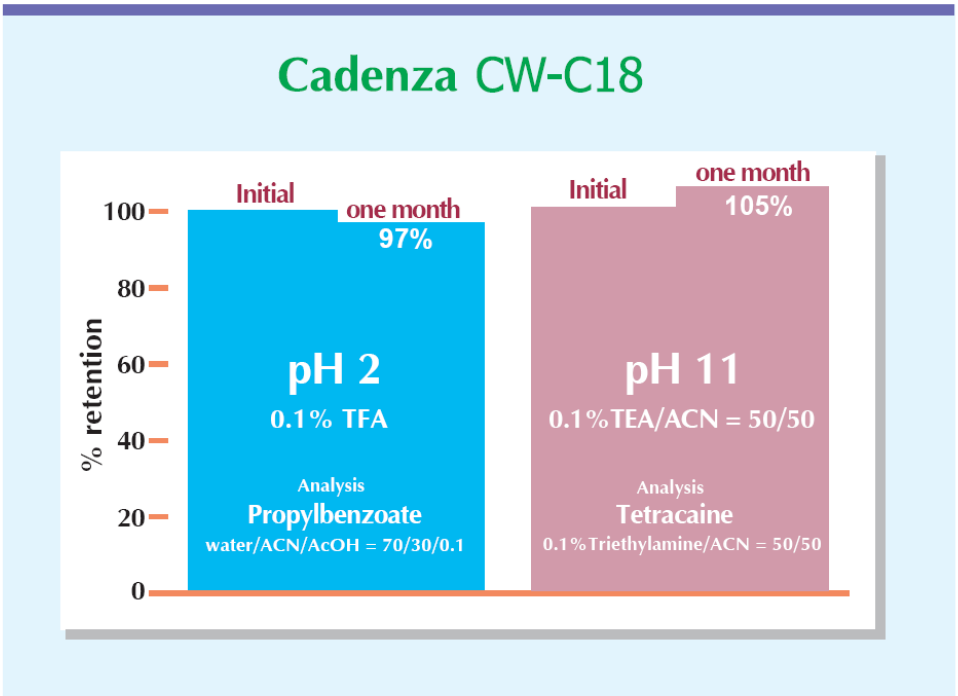
CADENZA CW-C18 A New, High Efficiency 3µm, WIDE PORE Material for SMALL MOLECULES

- Very Low Back pressure for Ultra Fast, Ultra High Resolution
- Suitable for use on UPLC™ and Conventional Systems
- High Resolution - n/M 170,000
- Wide pH Tolerance, 2-11
- Suitable for use in place of Fused Core materials

Cadenza CW-C18 is a high-throughput, high-resolution ODS phase, which consists of 3µm silica particle with a 30nm pore size. CW-C18 utilizes the same bonding / end-capping technology as CD-C18. Furthermore, CW-C18 (30nm pore size) has less micropores than the standard 12nm pore-sized CD-C18. This reduced number of micropores on the silica surface results in improved end-capping efficiency and reduced silanol activity.

pH Stability of Cadenza CW-C18



Hydrophobic Properties and Retention on Cadenza CW-C18

Alkali Durability

The unique end-capping technology utilized in making CW-C18 results in improved durability under alkali mobile phase conditions. For the analysis of certain basic compounds, such as tetracaine (see above), basic mobile phase conditions are sometimes required.

CW-C18 shows improved column lifetime under alkali mobile phase conditions (0.1% TEA, pH 11). CW-C18 shows excellent durability under a wide pH range, and is useful for numerous applications - including small molecule analysis.

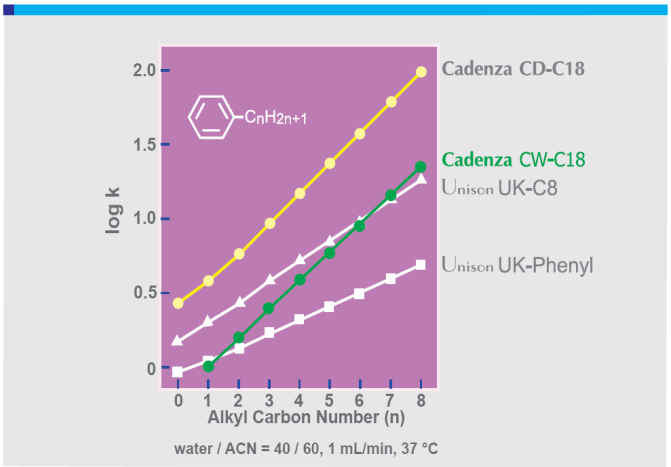
Acid Durability

CW-C18 shows excellent durability under low pH conditions (0.1% TFA, pH 2), with almost no loss in retention.

The figure above shows the relationship between retention factor and the alkyl carbon number (n) for alkylbenzenes.

Hydrophobicity is defined as the molecular recognition of a methylene group (e.g. alpha for two compounds differing by a CH2 group). The graph shows that for C3 or larger solutes, there is a linear relationship between retention and carbon chain length.

Retention properties (log k) on CW-C18 are lower than CD-C18 (Imtakt's Standard 3µm packing) and similar to C8 (Unison UK-C8).



Ref) N.Tanaka *et.al.*, J. Chromatg. Sci., 27, 721 (1989)

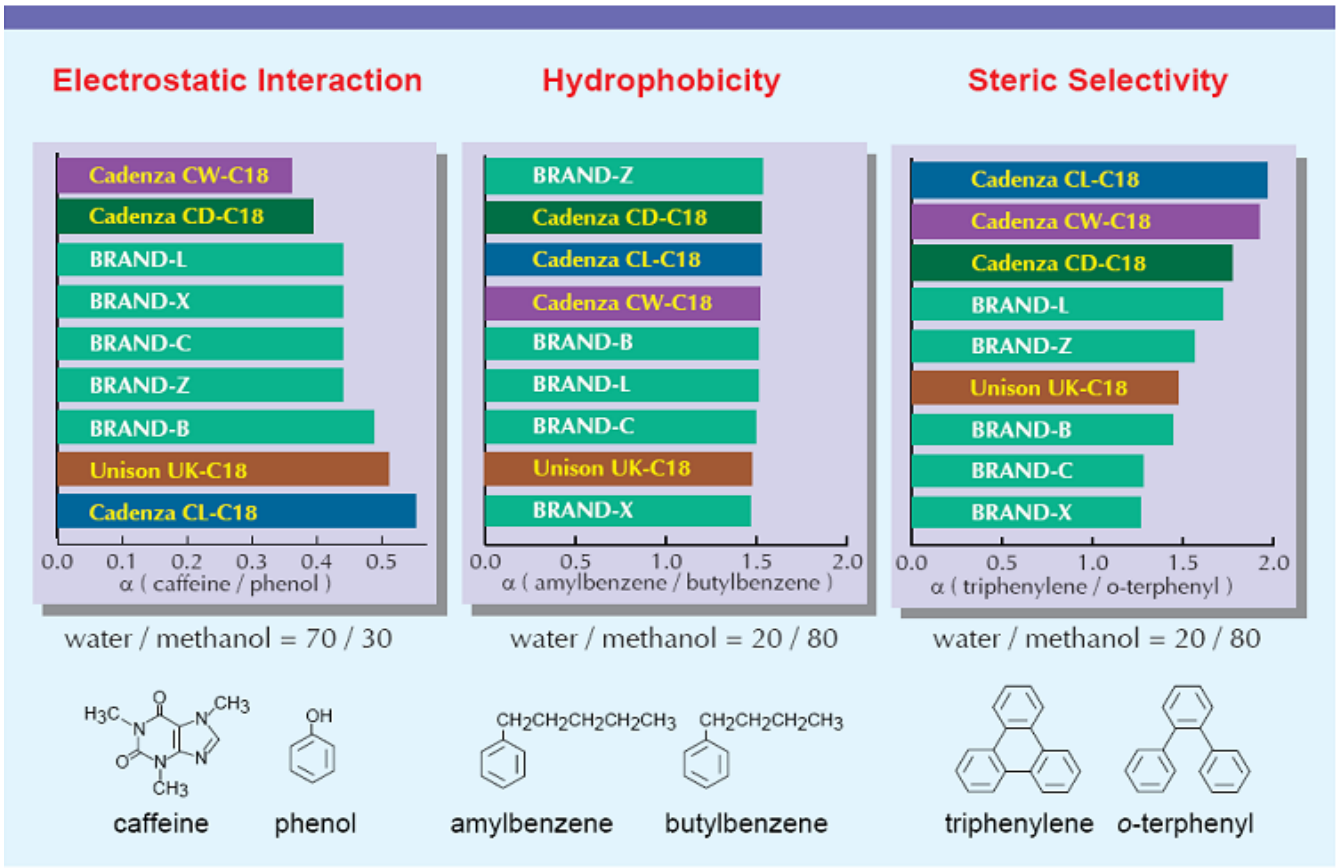
This results in faster elution of highly hydrophobic compounds, while offering different selectivity than a C8 phase (apparent by the different slopes between the two phases).

In contrast, the slopes are almost parallel between CW-C18 and CD-C18. This shows that the hydrophobicity for CW-C18 and CD-C18 are almost identical (a result of the ligand density being almost equal).

In conclusion, CW-C18 has the same hydrophobic selectivity as CD-C18, and can provide faster elution than conventional ODS.

Moreover, CW-C18 is a high resolution ODS phase using a 3µm silica particle, with an opportunity to provide faster analysis by replacing conventional ODS or Fused Core Packings with CW-C18 under the same operating conditions.

Basic Interaction of Cadenza CW-C18



Ref) N.Tanaka *et.al.*, J. Chromatg. Sci., 27, 721 (1989)

Due to the larger pore size, there are several key advantages:

- **Better end-capping efficiency provides improved peak shape**
- **Higher-speed analysis under the same conditions as conventional ODS or Fused Core columns**
- **Improvement of peak response for relatively large molecules.**

It provides different selectivity from other ODS phases due to different molecular interaction as follows:

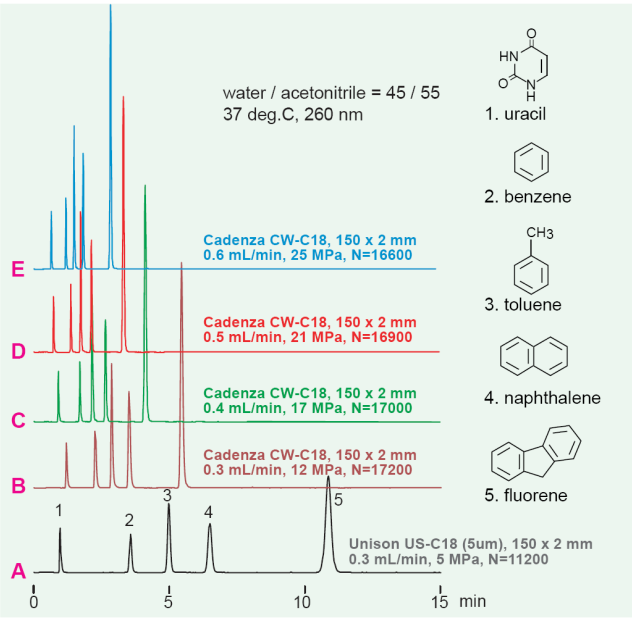
Hydrophobicity

Hydrophobicity is a fundamental property of ODS phases. CW-C18 results in almost the same value which means the same ODS ligand density as CD-C18 (same phase structure).

High Throughput with Cadenza CW-C18 at Low Back Pressures

Electrostatic Interaction

This interaction is related to the existence of siloxane and silanol on the surface of silica material. CW-C18 shows a minimum value and was similar to CD-C18. These low values derive from Imtakt's proprietary, unique and effective polymeric end-capping technology.



Steric Selectivity

High ligand density ODS phase has the ability to recognize the steric structure of similar compounds. CW-C18 showed a large value similar to CD-C18. CW-C18 is useful for high-throughput analysis.

The wide-pore nature of Cadenza CW-C18 means it has 1/3 surface of a traditional pore-size column. The lower ODS coverage reduces the analysis time by 50% under the same LC conditions.

Cadenza CW-C18 allows for increased performance when compared to 5µm particles (Chromatogram A and B).

In addition, it can provide ultra-high speed analysis with pressures compatible with standard HPLC instruments (Chromatogram C to E). Sub-2um particle columns require extremely high pressures.

In contrast, Cadenza CW-C18 (3µm) can be operated using normal (standard) HPLC equipment, as well as UPLC - resulting in a balance of both low pressure and high plate counts.

In addition, a 250mm length column (which is difficult to make using sub-2um particle) is available for high resolution and high speed analysis.

In sum, Cadenza CW-C18 can provide many solutions to scientists working with basic compounds, high molecular weight compounds, and hydrophilic compounds.

Comparison of Cadenza CW-C18 and Fused Core

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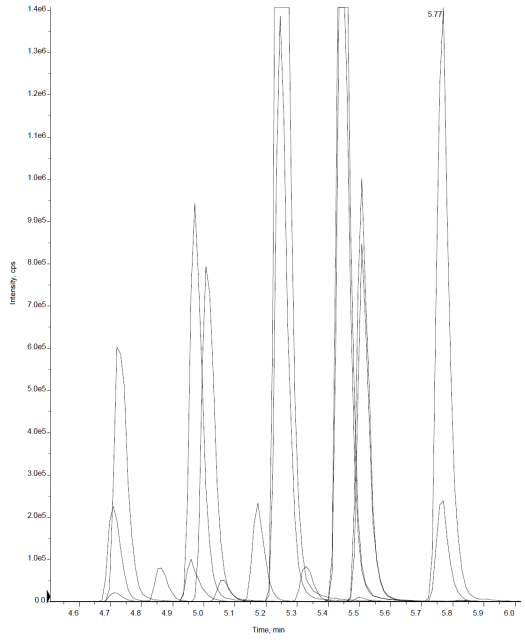
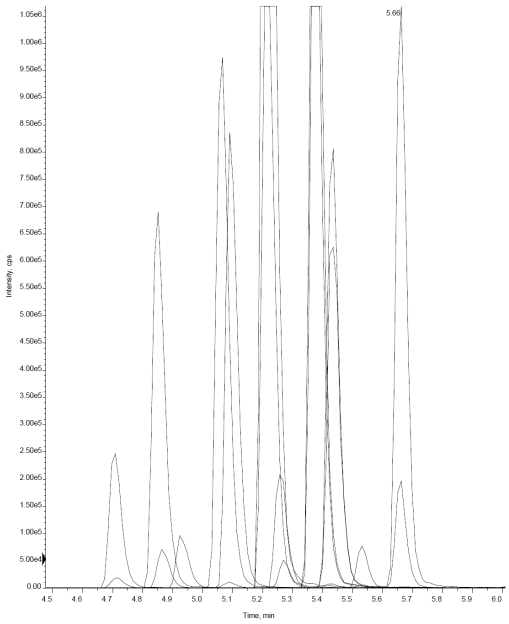
2 X 50mm Cadenza CW – 300Angstrom, High Resolution 3um Particle C18



Cadenza CW, 300Å C18 50 X 2.0 3µm
BACK PRESSURE 76 BAR

2.1 X 50mm Ascentis Express – Fused Core, 2.7um, C8



Supelco Acentis C8, 50 X 2.1, 2.7µm
BACK PRESSURE 136 BAR

Cadenza CW-C18 can be supplied in a wide range of dimensions, from 50um ID to 20mm and from 1cm in length to 500mm.

Not all diameters are available in all lengths. E.g. Longer columns for more resolution, narrower columns for lower solvent consumption.

We provide 1mm and 1.5mm ID columns in all Imtakt phases which would be ideal for use with a UPLC, offering the same efficiency as UPLC, but much lower back pressures. This means that you can run longer columns on a UPLC for even more resolution. Columns up to 250mm can be provided, although this may be too long for use with an Aquity system.

Chromatographic Conditions
Gradient: 5-95% CH3CN 0.1% formic acid in 0.1% formic acid over 5 minutes (1-6 minutes on chromatogram)
Temp: 40C
5µl injected (50% CH3CN / H2O), 0.1% formic acid
Flow rate: 400 µl/minute
Agilent 1100, Sciex API 3000
Sample: Metabolic Intermediates.

Data Kindly Provided by Dr Steve Wood, Q3 Analytical

Ordering Information—Standard Dimensions

For other dimensions, please enquire

Product Code	Product Name	Notes
CW000	Cadenza CW-C18 (10x4.6mm)	3um, 30nm, ODS, end-capped
CW001	Cadenza CW-C18 (30x4.6mm)	3um, 30nm, ODS, end-capped
CW002	Cadenza CW-C18 (50x4.6mm)	3um, 30nm, ODS, end-capped
CW003	Cadenza CW-C18 (75x4.6mm)	3um, 30nm, ODS, end-capped
CW004	Cadenza CW-C18 (100x4.6mm)	3um, 30nm, ODS, end-capped
CW005	Cadenza CW-C18 (150x4.6mm)	3um, 30nm, ODS, end-capped
CW006	Cadenza CW-C18 (250x4.6mm)	3um, 30nm, ODS, end-capped
CW007	Cadenza CW-C18 (500x4.6mm)	3um, 30nm, ODS, end-capped
CW009	Cadenza CW-C18 (20x4.6mm)	3um, 30nm, ODS, end-capped
CW011	Cadenza CW-C18 (30x1mm)	3um, 30nm, ODS, end-capped
CW012	Cadenza CW-C18 (50x1mm)	3um, 30nm, ODS, end-capped
CW013	Cadenza CW-C18 (75x1mm)	3um, 30nm, ODS, end-capped
CW014	Cadenza CW-C18 (100x1mm)	3um, 30nm, ODS, end-capped
CW015	Cadenza CW-C18 (150x1mm)	3um, 30nm, ODS, end-capped
CW016	Cadenza CW-C18 (250x1mm)	3um, 30nm, ODS, end-capped
CW020	Cadenza CW-C18 (10x2mm)	3um, 30nm, ODS, end-capped
CW021	Cadenza CW-C18 (30x2mm)	3um, 30nm, ODS, end-capped
CW022	Cadenza CW-C18 (50x2mm)	3um, 30nm, ODS, end-capped
CW023	Cadenza CW-C18 (75x2mm)	3um, 30nm, ODS, end-capped
CW024	Cadenza CW-C18 (100x2mm)	3um, 30nm, ODS, end-capped
CW025	Cadenza CW-C18 (150x2mm)	3um, 30nm, ODS, end-capped
CW026	Cadenza CW-C18 (250x2mm)	3um, 30nm, ODS, end-capped
CW029	Cadenza CW-C18 (20x2mm)	3um, 30nm, ODS, end-capped
CW030	Cadenza CW-C18 (10x3mm)	3um, 30nm, ODS, end-capped
CW031	Cadenza CW-C18 (30x3mm)	3um, 30nm, ODS, end-capped
CW032	Cadenza CW-C18 (50x3mm)	3um, 30nm, ODS, end-capped
CW033	Cadenza CW-C18 (75x3mm)	3um, 30nm, ODS, end-capped
CW034	Cadenza CW-C18 (100x3mm)	3um, 30nm, ODS, end-capped
CW035	Cadenza CW-C18 (150x3mm)	3um, 30nm, ODS, end-capped
CW036	Cadenza CW-C18 (250x3mm)	3um, 30nm, ODS, end-capped
CW039	Cadenza CW-C18 (20x3mm)	3um, 30nm, ODS, end-capped
GCCW0C	Cadenza CW-C18 Guard Cartridge (5x1mm)	3um, 30nm, ODS, end-capped
GCCW0M	Cadenza CW-C18 Guard Cartridge (10x8mm)	3um, 30nm, ODS, end-capped
GCCW0S	Cadenza CW-C18 Guard Cartridge (5x2mm)	3um, 30nm, ODS, end-capped

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