EIROSHELL and SOLAS

Next Generation Chromatography

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Vision

Glantreo are a small agile innovative company with the ability to produce rapid prototypes. We have all the building blocks, which build synergistically to create next generation chromatography. We have advanced each step from silica to column by ensuring our provenance for every building block and creating a quality system check for each column. Thus Glantreo have developed a remarkable range of HPLC columns, with excellent efficiency, superb separation, for use over a range of pH.

Our technology platforms and quality assurance system has developed a tight specification on pore and particle size, generating columns with exceptional high plate numbers yet low back pressure. Our proprietary silica and surface ligands deliver to a broad array of separation scientists. Increasing throughput whilst providing longer lasting columns and less stress on component parts.

> EIROSHELL™ superficially porous particles (SPPs)

SOLAS™ fully porous particles (FPPs)

From Silica to Columns



variety of bonded c₃₈H₃₇ phases

> optimised column packing

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n-house developed platforms, SOLAS and EIROSHELL

> **Glantreo** provide knowledge, innovation and service, with our values making us different. Glantreo control the entire process from end to end, creating next generation of chromatography. We are seeking partners who have access to a customer base and routes to market.



Next Generation Chromatography

Silica Development

Glantreo synthesise silica. We identified a gap in the market, monodispersed silica without classification.

- 1. Highly monodispersed without the need to size classify leading to high chromatographic efficiency
- Monodensity leading to higher packing stability as there are no macro pores within the particles. 2.
- 3. 'Hard Silica' (produced with heat during manufacturing) leads to greater stability and longevity of material and columns.

Glantreo have built a platform for over 15 years creating a solid foundation in the production of columns from material science to commercially scalable products. The initial focus was on silica SOLAS fully porous particles (FPP). These spherical particles are pure silica which are highly porous. The EIROSHELL platform produces superficially porous particles (SPPs). SPPs also called core-shell, fused-core shell, partially porous, pellicular, or solid-core. EIROSHELL particles are made of a solid, nonporous, impermeable silica centre surrounded by a porous shell layer with similar properties to those of the fully porous materials (SOLAS). There is an optimum ratio between the core and the shell. We control that ratio and it may vary between application and processes.

There are companies who claim to make their own silica who do not actually manufacture silica. Glantreo have the knowledge to control and optimise the physical properties and surface chemistries of our materials.

Glantreo continue to innovate and invent novel nanomaterials working in a range of areas such as drug delivery and sepsis management. We know chromatography is a balancing act between resolution and time. This is next generation chromatography.

SOLAS	EIROSHELL
Fully Porous Particles-Particle Sizes	Superficially Porous Particles-Particle Sizes
1.7µm	1.7µm
1.9µm	
	2.6µm
3.0µm	
5.0µm	

- pore size,

- •
- core: porosity ratio for SPP.



Column Packing

Silica Functionalisation

Stationary Phase	Chemical Structure	End Capped	USP Code	Ensuring complete product provenance was impo	orta
C18 C18 Plu s	O Si C ₁₉ H ₂₇	yes	L1	reliable and reproducible columns time after time	5 to 2.
C8	is s	yes	L7		
C4	O Si C ₄ H ₉	yes	L26		antreo
Phenyl Hexyl Phenyl Hexyl Plus	o Si	yes	L11		6
PFP (Pentafluorophenyl)	F F F F F F	yes	L43	Column Internal Diameter (ID) 2.1mm o 3.0mm O 4.6mm ()	
Cyano		yes	L10	Applications	
BiPhenyl		yes	L11	Semi Preparative Analytical	
		-		MS	



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Quality Assurance and Control

Quality assurance is built into every step ensuring the entire process is managed and controlled creating new generation chromatography. We carry out two checks on each column prior to release.



These include a 3 Analyte (UTN) mix which is included in the **Certificate of Analysis** (COA) as highlighted for a **SOLAS column**. (see page 9)

The second test is used as part of Glantreo's quality procedures to characterise surface properties of the chromatography media for every column manufactured on site. It is an established method to evaluate interactions between a stationary phase and different kinds of analytes. The different properties of the stationary phase are tested using separation of standard organic chemicals, in elution order; Uracil, Toluene, p-Tolunitrile, 3,4-Dimethylanisole and Quinizarin.

SOLAS C₁₈ – 5µm 120Å 150mm x 4.6mm

Chromatographic conditions: Mobile Phase: 58:42 Acetonitrile:Water; Flow rate: 1.0mL/min; Injection Volume: 1.0µL; UV: 254nm





Elution Number	Compound	Molecule Type	Probe for	Reactivity
1	Uracil	Cyclic Base	Void Volume	Un retained compound
2	Toluene	Aromatic Neutral	hydrophobic character	retention
3	p-Tolunitrile	Aromatic Base	Water probe	Can H bond with Hydrogen
4	3,4-Dimethylanisole	Aromatic neutral with H bonding from Oxygen	End capping	More Silanol present the more tailing that will be observed
5	Quinizarin	Aromatic Neutral	Silanol Probe	H bonding

Certificate of Analysis

SOLAS[™] 5.0µm C₁₈ – Batch Number: DIAS6-02

Specification	Batch result
4.8 – 5.2	5.0
< 1.4	1.3
100-120	110
0.8-1.0	0.8-1.0
300-400	350
Specification	Batch result
15.0-17.0	16.0
Conditions: Column dimensions: 4.6mm ID of Mobile Phase: 60:40 Acetonitrile Flow rate: 2.0 ml/min Injection volume: 1.0 µL Temperature: 25°C Detector: UV @ 254 nm Analytes in eluting order: 1. Uracil 2. Toluene 3. Naphthalene	k 150mm e:Water (v:v)
	Specification 4.8 - 5.2 < 1.4 100-120 0.8-1.0 300-400 Specification 15.0-17.0 Conditions: Column dimensions: 4.6mm ID of Mobile Phase: 60:40 Acetonitriller Flow rate: 2.0 ml/min Injection volume: 1.0 µL Temperature: 25°C Detector: UV @ 254 nm Analytes in eluting order: 1. Uracil 2. Toluene 3. Naphthalene

Measured parameters based on the three peaks above

Peak	RT(Min)	k 'Factor	Tailing Factor	Plates (N)	Reduced plate height
1	0.656	0.000	1.209	4174.065	7.187
2	4.009	5.111	1.067	21681.479	1.384
3	5.289	7.062	1.064	22934.244	1.308

Date:



Application Development

We understand the nature of real samples and achieving separation in difficult matrices. We want to support the development of applications for niche analytes. We have the knowledge to develop a custom made column for your requirements leading to next generation chromatography.

Column	Functionality	Particle Size (µm)	Pore Size (Å)	Surface Area (m2/g)	Carbon Loading (%)	Column ID (mm)	Column Length (mm)	Reference Number	Application
Eiroshell	C ₁₈	1.9	120	140	10	2.1, 3.0, 4.6	50, 100, 150, 250	COLSPP1.9C18	Small-Medium Organic Molecules, in pharmaceutical, environmental,
Eiroshell	C ₁₈	2.6	120	140	10	2.1, 3.0, 4.6	50, 100, 150, 250	COLSPP2.6C18	clinical industries
Eiroshell	C ₁₈	2.6	700	140	10	2.1, 3.0, 4.6	50, 100, 150, 250	COLSPP2.6C18LP	Protein/biomolecules
SOLAS	C ₁₈	1.9	1000	30	18	2.1, 3.0, 4.6	50, 100, 150, 250	COLFPP1.9C4LP	
SOLAS	C ₁₈	3	120	140	18	2.1, 3.0, 4.6	50, 100, 150, 250	COLFPP3.0C18	Small-Medium Organic Molecules,
SOLAS	ODS	3	120	300	18	2.1, 3.0, 4.6	50, 100, 150, 250	COLFPP5.0C18	in pharmaceutical, environmental, clinical industries
SOLAS	BDS	3	120	300	18	2.1, 3.0, 4.6	50, 100, 150, 250	COLFPP3.00DS	
SOLAS	C ₁₈	5	120	140	18	2.1, 3.0, 4.6	50, 100, 150, 250	COLFPP3.0BDS	
SOLAS	ODS	5	120	300	18	2.1, 3.0, 4.6	50, 100, 150, 250	COLFPP5.00DS	
SOLAS	BDS	5	120	300	18	2.1, 3.0, 4.6	50, 100, 150, 250	COLFPP5.0BDS	

