

**Carboxylated cyclofructan 6 as a hydrolytically stable high efficiency stationary phase for hydrophilic interaction liquid chromatography and mixed mode separations**

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Supplementary Information

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## Supporting information 1:

### Characteristics of the tested stationary phases from Irgum and Lucy.<sup>1, 2</sup>

#	Brand name	Manufacturer	Support	Functionality	Particle size (µm)	Pore size (Å)	Surface area (m <sup>2</sup> /g)	Column length (mm)	Column diameter (mm)
Irgum's tested phases									
1	ZIC-HILIC	Merck	Silica	Polymeric sulfoalkylbetaine zwitterionic	5	200	135	100	4.6
2	ZIC-HILIC	Merck	Silica	Polymeric sulfoalkylbetaine zwitterionic	3.5	200	135	150	4.6
3	ZIC-HILIC	Merck	Silica	Polymeric sulfoalkylbetaine zwitterionic	3.5	100	180	150	4.6
4	ZIC-pHILIC	Merck	Porous polymer	Polymeric sulfoalkylbetaine zwitterionic	5	–	–	50	4.6
5	Nucleodur HILIC	Macherey-Nagel	Silica	Sulfoalkylbetaine zwitterionic	5	110	340	100	4.6
6	PC HILIC	Shiseido	Silica	Phosphorylcholine zwitterionic	5	100	450	100	4.6
7	TSKgel Amide 80	Tosoh Bioscience	Silica	Amide (polymeric carbamoyl)	5	80	450	100	4.6
8	TSKgel Amide 80	Tosoh Bioscience	Silica	Amide (polymeric carbamoyl)	3	80	450	50	4.6
9	PolyHYDROXYETHYL A	PolyLC	Silica	Poly(2-hydroxyethyl aspartamide)	5	200	188	100	4.6
10	LiChrospher 100 Diol	Merck	Silica	2<comma>3-Dihydroxypropyl	5	100	350	125	4
11	Luna HILIC	Phenomenex	Silica	Cross-linked diol	5	200	185	100	4.6
12	PolySULFOETHYL A	PolyLC	Silica	Poly(2-sulfoethyl aspartamide)	5	200	188	100	4.6
13	Chromolith Si	Merck	Silica monolith	Underivatized	N/A	130	300	100	4.6
14	Atlantis HILIC Si	Waters	Silica	Underivatized	5	100	330	100	4.6
15	Purospher STAR Si	Merck	Silica	Underivatized	5	120	330	125	4
16	LiChrospher Si 100	Merck	Silica	Underivatized	5	100	400	125	4
17	LiChrospher Si 60	Merck	Silica	Underivatized	5	60	700	125	4
18	Cogent Type C Silica	Microsolv	Silica	Silica hydride ("Type C" silica)	4	100	350	100	4.6
19	LiChrospher 100 NH2	Merck	Silica	3-Aminopropyl	5	100	350	125	4
20	Purospher STAR NH2	Merck	Silica	3-Aminopropyl	5	120	330	125	4
21	TSKgel NH2-100	Tosoh Bioscience	Silica	Aminoalkyl	3	100	450	50	4.6
Lucy's tested phases									
22	Atlantis HILIC	Waters	Silica	Underivatized	3	100	330	50	1
23	Onyx silica monolith	Phenomenex	Silica monolith	Underivatized	N/A	130	300	100	4.6
24	Zorbax HILIC plus	Agilent	Silica	Underivatized	3.5	95	160	100	4.6
25	Silica monolith coated w	Homemade	Silica monolith	Silica-cationic nanoparticle	N/A	130	300	80	4.6
26	Zorbax RRHD HILIC plus	Agilent	Silica	Underivatized	1.8	95	160	100	3
27	Acclaim Trinity P1	Dionex	Silica	Silica-cationic nanoparticle	3	–	–	150	3
28	Cosmosil HILIC	Nacalai	Silica	Triazole	5	120	300	150	4.6
29	Acclaim HILIC-10	Dionex	Silica	Proprietary neutral polar functionality	3	120	300	150	4.6
30	Zorbax Eclipse XDB-C18	Agilent	Silica	Octadecyl	5	80	180	150	4.6
31	XBridge C18	Waters	Silica (BEH)	Octadecyl	5	130	185	150	4.6
32	YMC Pro C18	YMC	Silica	Octadecyl	3	120	340	150	2
33	Zorbax SB-aq	Agilent	Silica	Octadecyl	3.5	80	180	150	2.1

## References:

1. N. P. Dinh, T. Jonsson and K. Irgum, *Journal of Chromatography A*, 2011, **1218**, 5880-5891.
2. M. E. A. Ibrahim, Y. Liu and C. A. Lucy, *Journal of Chromatography A*, 2012, **1260**, 126-131.