Supporting Information

High Performance Liquid Chromatography at −196ºC

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Content

Supplementary Table S1

Table S1. Chemical properties of analytes.

	m.p.	b.p.	Triple point		Critical point	
	[°C]	[°C]	[°C]	[MPa]	[°C]	[MPa]
N_2	-210	-196	-210	0.0125	-145	3.40
Ar	-189	-186	-189	0.689	-122	4.86
CH_4	-183	-163	-182	0.0117	-83	4.60
C_2H_6	-183	-89	-183	1.13×10^{-6}	32	4.87
C_3H_8	-188	-42	-188	1.72×10^{-10}	97	4.25
n-C_4H_{10}	-138	-1	-138	6.74×10^{-7}	152	3.80
iso-C_4H_{10}	-160	-12	-159	1.21×10^{-8}	135	3.63
C_2H_4	-169	-104	-169	1.22×10^{-4}	9	5.04
C_3H_6	-185	- 47	-185	7.44×10^{-10}	91	4.56

Supplementary Figure S1

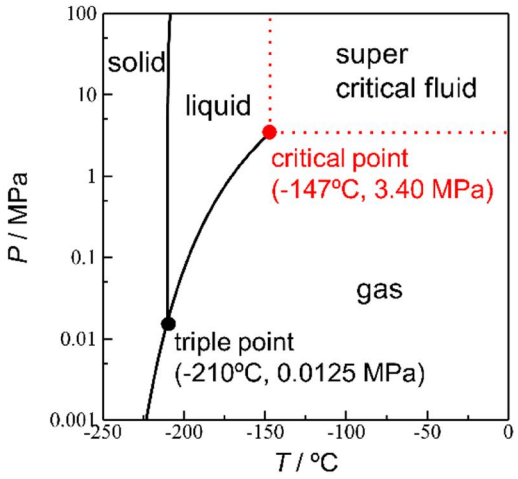

Figure S1. Phase diagram of nitrogen.

Supplementary Figure S2

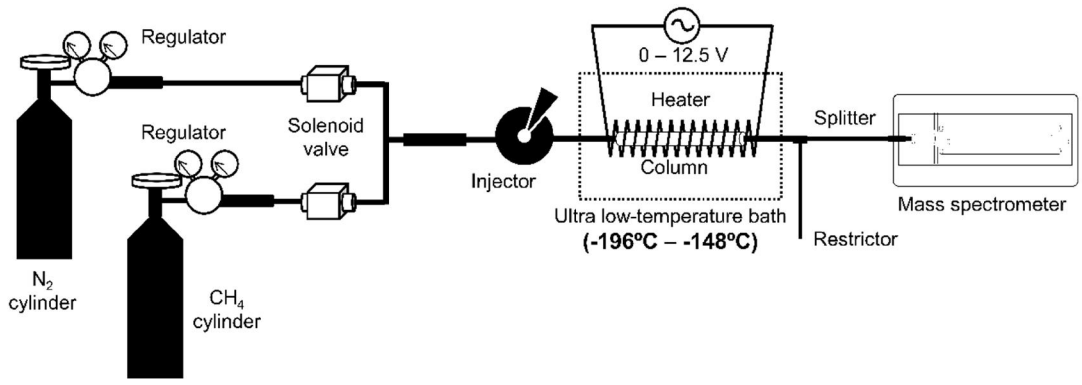

Figure S2. Schematic of ultra-low temperature liquid chromatograph using a mixture of nitrogen and methane as the mobile phase.

Supplementary Figure S3

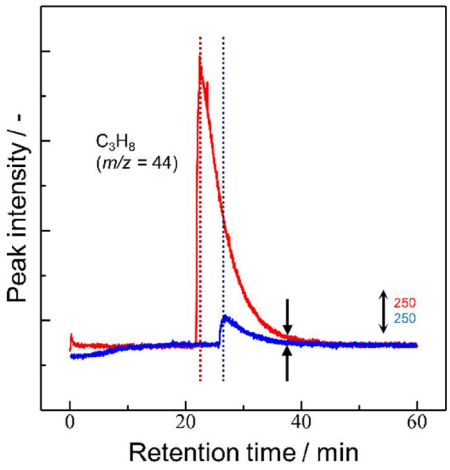

Figure S3. Effect of injection amount on the elution of propane.

Supplementary Figure S4

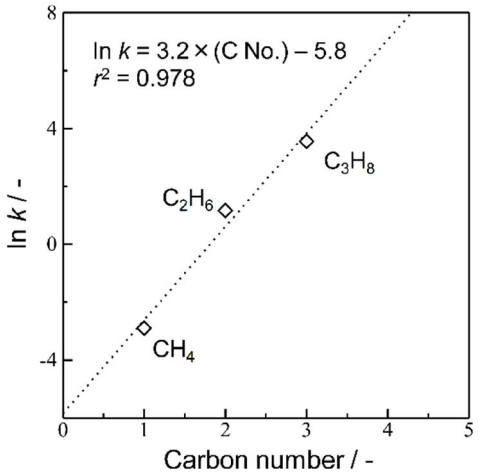

Figure S4. Relationship between carbon number in alkane and the retention factor (*k*) in HPLC at -196°C with a pure liquid nitrogen mobile phase.

Supplementary Figure S5

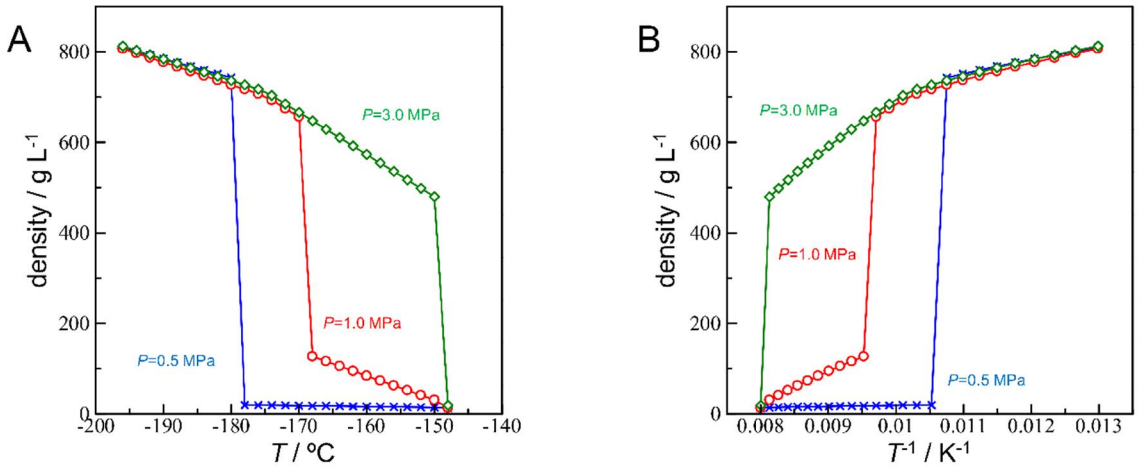

Figure S5. Relationship between density of nitrogen and temperature at various pressure. (A) density vs. *T*, (B) density vs. 1/*T*.