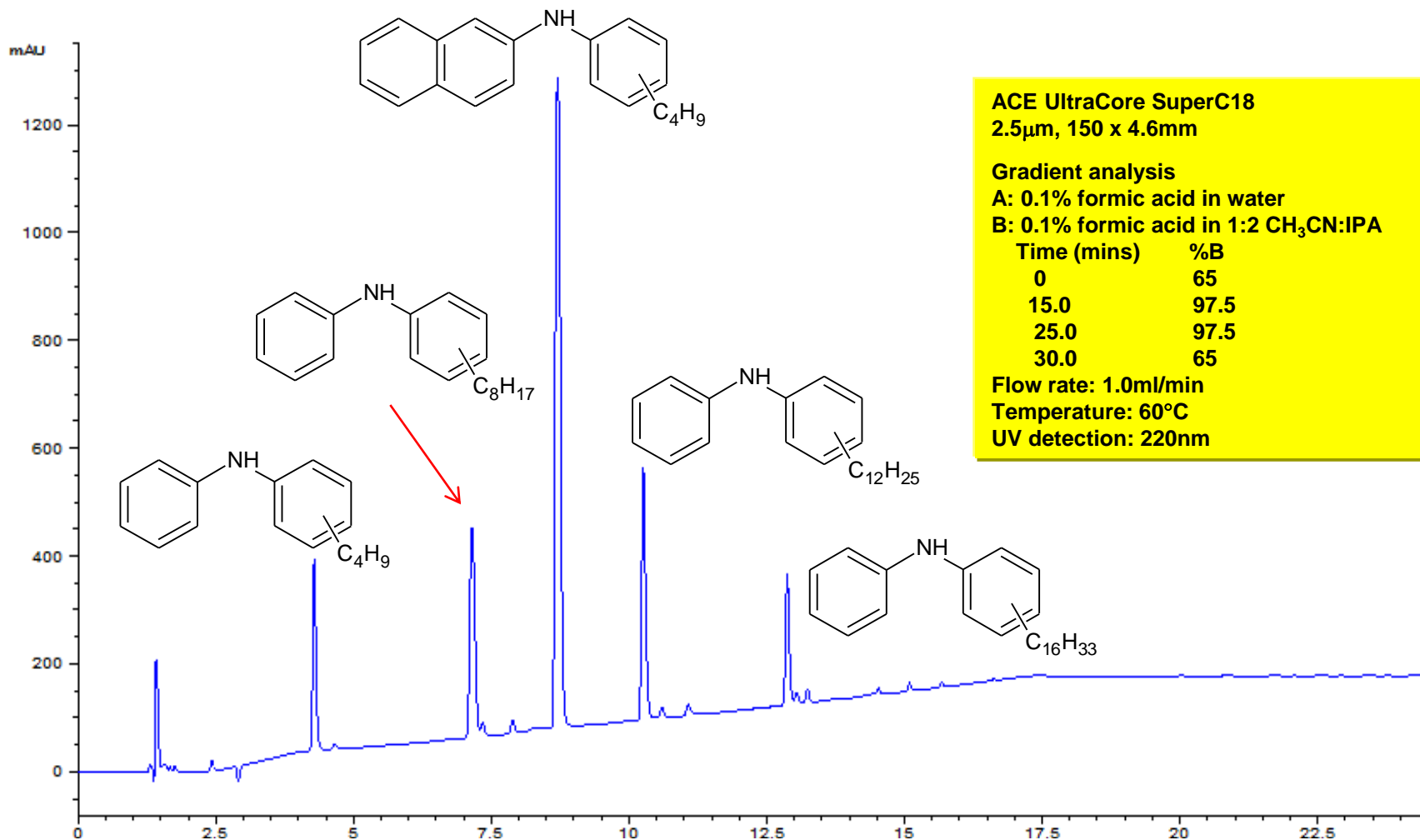


# PetroChemical Industry

## Lubricant Additives: ADPA / OPAN Antioxidants



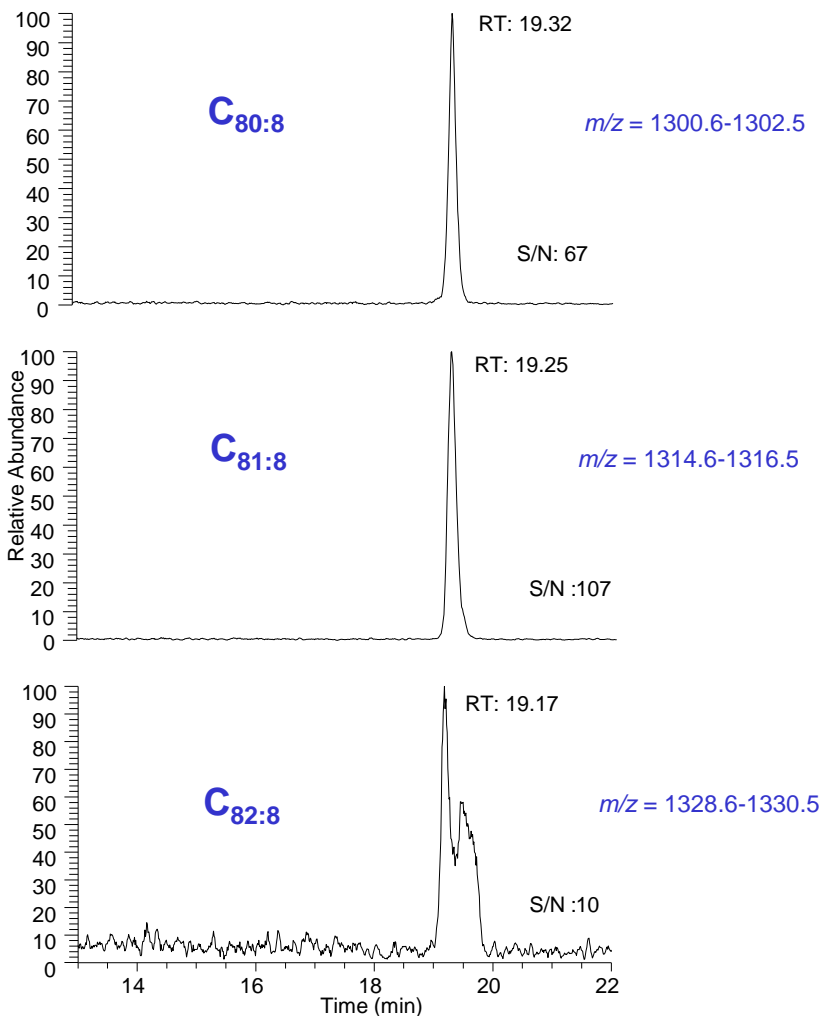
**ACE UltraCore SuperC18**  
2.5µm, 150 x 4.6mm

**Gradient analysis**  
**A: 0.1% formic acid in water**  
**B: 0.1% formic acid in 1:2 CH<sub>3</sub>CN:IPA**

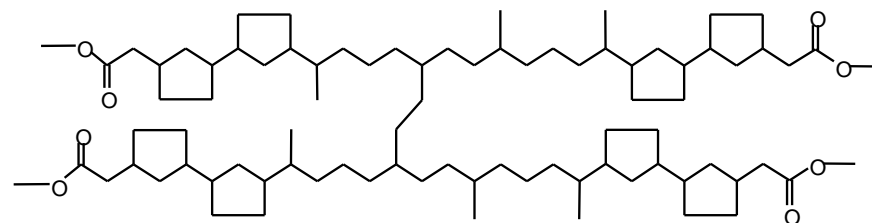
Time (mins)	%B
0	65
15.0	97.5
25.0	97.5
30.0	65

**Flow rate: 1.0ml/min**  
**Temperature: 60°C**  
**UV detection: 220nm**

# Polycyclic Tetracarboxylic Acids



C80-82 polycyclic tetracarboxylic acids isolated from oilfield deposits



**Tetramethyl ester of C<sub>80:8</sub> ring acid**

ACE UltraCore SuperPhenylHexyl 2.5 $\mu$ m, 100 x 2.1mm  
 Gradient analysis  
 A: CH<sub>3</sub>OH – H<sub>2</sub>O (98:2) containing 10mM ammonium acetate  
 B: IPA-H<sub>2</sub>O (98:2) containing 10mM ammonium acetate

T (mins)	%B	T (mins)	%B
0	0	15	100
1	0	25	100

Flow rate: 0.15ml/min  
 Column temperature: Ambient  
 Injection volume: 5 $\mu$ l  
 LCQ Ion trap MS  
 LC-ESI-MS extracted ion chromatograms  
 Compounds detected as ammoniated quasimolecular ions  
 [M+NH<sub>4</sub>]<sup>+</sup>  
 Detection limit ~ 0.1ppm