

Mechanical Strength (Flexural Strength) of Ultra ALLOY® and other Metal Capillary Columns

Ultra ALLOY® metal capillary columns have an excellent flexural strength because of the unique structure and composition of the column inner surface (see Technical Note UAT-002E). Fused silica coated metal capillary columns (R company in USA) available on the market suffer from cracking and delamination by marginal flexural force, dropping impact, or repetitive thermal shocks between low and high temperatures. Such damages of capillary columns are not always apparent by observation. Use of such damaged columns can end up with erroneous results or poor separations, depending on the species analyzed, due to irreversible absorption of materials. Figures below show column performances in terms of changes of chromatograms when the columns from both companies were coiled into diameters of 30cm and 3cm in the vicinity of the injection port. A metal capillary column from R company shows increased absorption and broadened peaks not only for polar species, but also saturated hydrocarbons which are normally unabsorbed. This indicates that the FS film has been broken, allowing the sample to react with exposed surface of stainless steel, while Ultra ALLOY® metal capillary column made with our proprietary graduated multilayer technology did not show any sign of such abnormality.

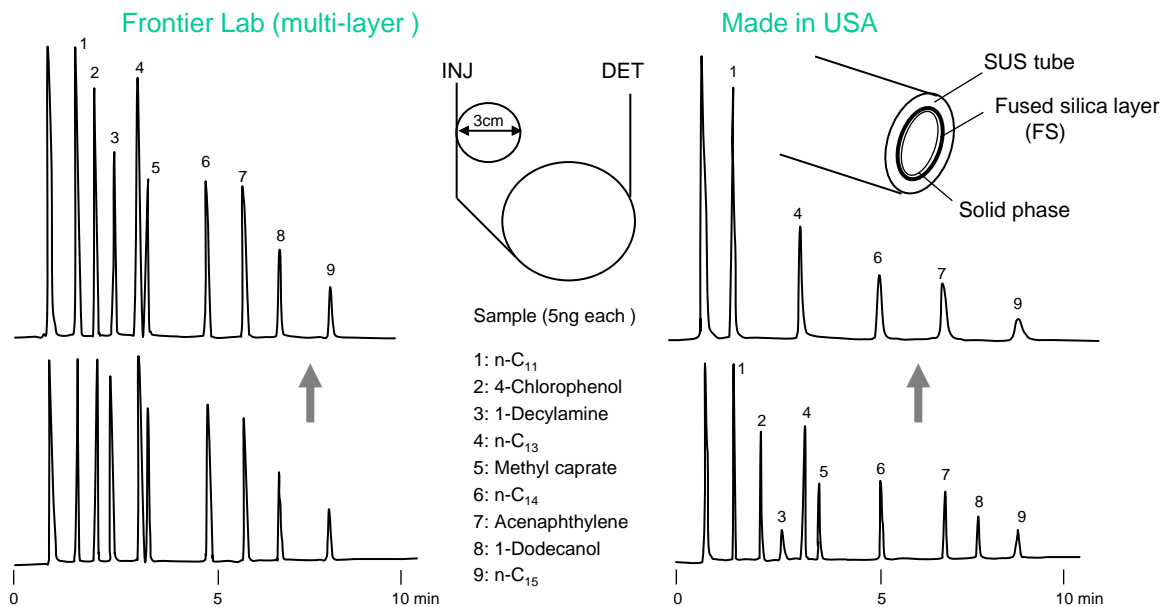


Fig.1 Chemical Inertness (Flexural Strength) of Ultra ALLOY® and other Metal Capillary Columns

Column : 5% diphenyldimethylpolysiloxane, 15m in length, 0.5mm id, 0.5µm in film thickness
 GC oven temp. : 120°C; Carrier gas : He 10kPa
 Injection port : Split ratio 1/30 at 300°C, Split vent, 60ml/min; Detector : FID at 350°C

Keywords : Mechanical Strength, Flexural Strength, Comparison with Others

Products used : Multi-functional pyrolyzer, UA-5

Applications : General Analysis, Column Flexural Problems

Related technical notes :

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