

Novel Silica Phases for Protein and
Peptide PREPARATIVE Separation:
DAISOGEL BIO Series

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NEW! Introducing the DAISOGEL BIO series

The XXI century is often considered as the era of “protein science”. Peptide and protein research is quickly maturing to be the major driving force for new kinds of pharmaceutical ingredients. For both, the research and the big scale of peptide and protein manufacturing spherical silica must be tailor made, fine tuned. The new line up of DAISOGEL shows **extended acidic and **alkalic resistance**, **high loadability** combined with exceptional **durability**.**

DAISOGEL BIO Series



- **The perfect choices for biopharmaceutical applications**
- **Novel chemical bonding assures stability under severe alkalic and acidic conditions**
- **Durable, ultra high purity silica base with 12, 20, 30 nm pore sizes, narrow particle size distribution range**
- **Available in 5, 10, 15 and 20 μm particle sizes**

New: BIO Series: SP-120-BIO



**Are you working with smaller peptides?
SP-120-BIO series**

The improved high density bonding and full endcapping makes it very suitable to separate or purify lower molecular weight compounds, especially smaller peptides.

The ODS phases are recommended for general use, first choice for unknown compounds.

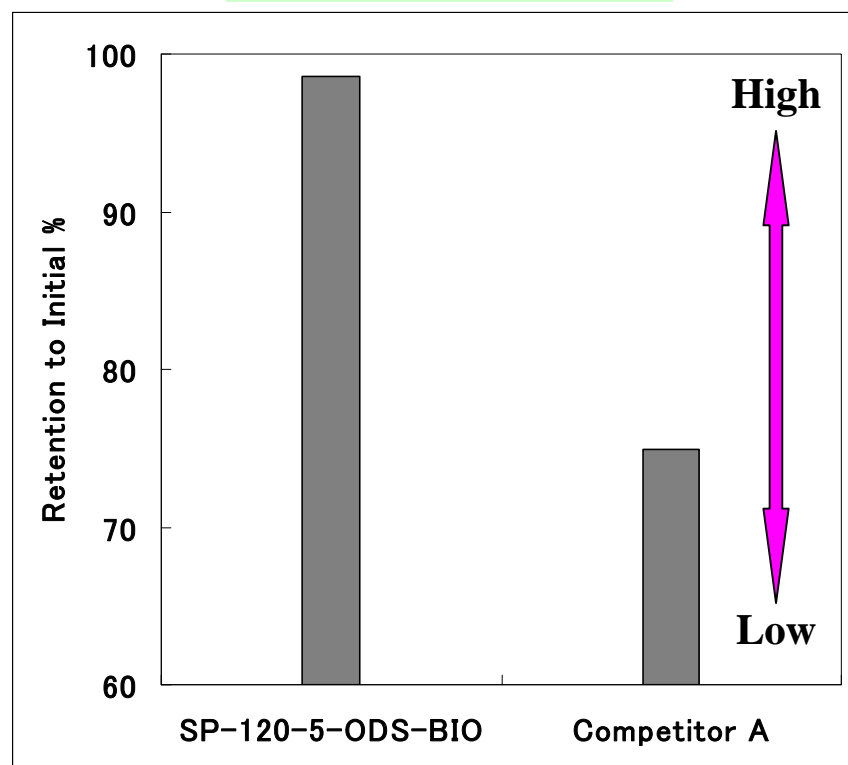
Available types:

SP-120-ODS-BIO, SP-120-C8-BIO, SP-120-C4-BIO

New: BIO Series: SP-120-ODS-BIO

Improvement in phase stability

Acidic resistance

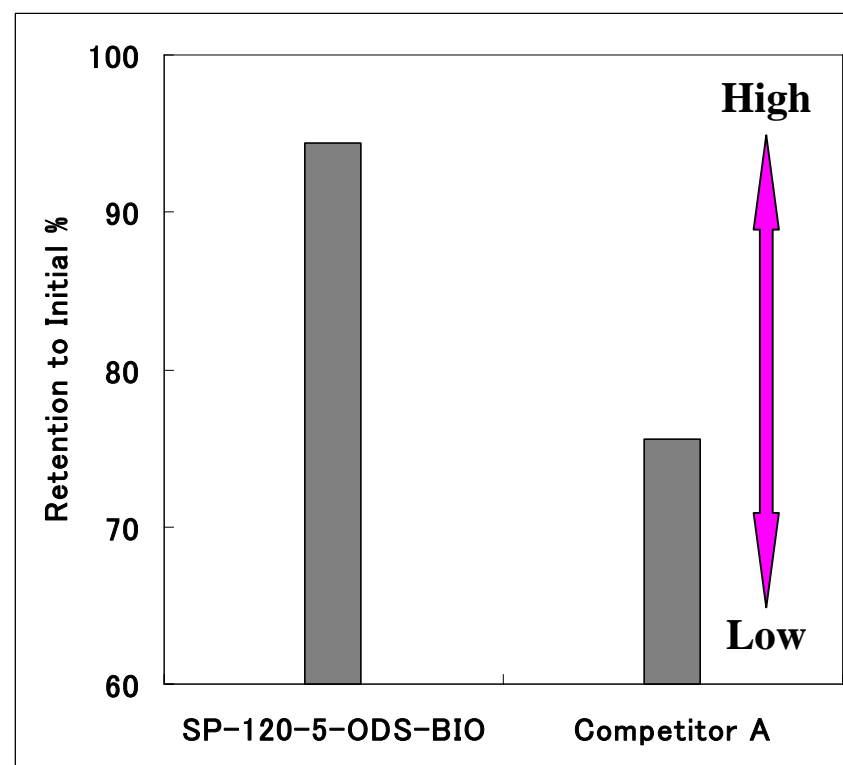


Column dimension: 4.6 mm I.D. x 150 mm length;

Mobile phase: CH₃CN/H₂O/TFA = 10/90/1;

Temperature: 70°C; Flow: 1.0 ml/min; Time for purge: 100 h.

Alkalic resistance



Column dimension: 4.6 mm I.D. x 150 mm length;

Mobile phase: CH₃CN/0.1N NaOH = 70/30;

Temperature: 40°C; Flow: 1.0 ml/min; Time for purge: 1.5 h.

New: BIO Series: SP-120-ODS-BIO



SP-120-5-ODS-BIO: Durability in acidic environment

Acidic duration test condition

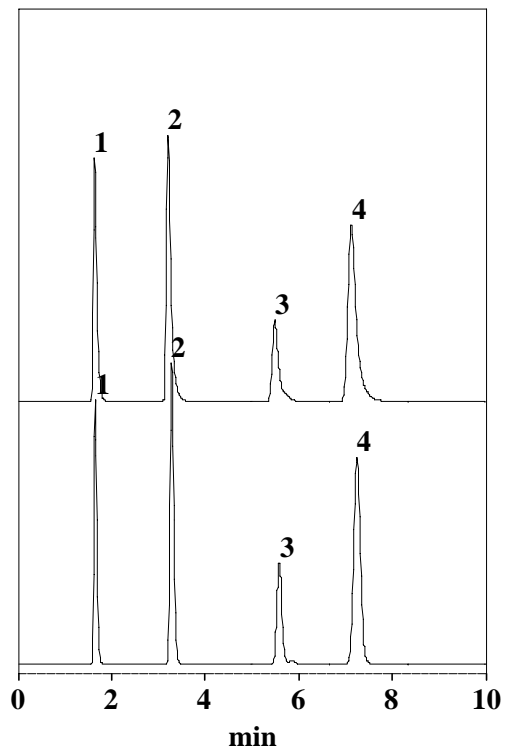
Mobile phase: CH₃CN/H₂O/TFA = 70/30/1 (~36h) -> 90/10/1 (36h~); Flow rate: 1.0 ml/min; Temperature: 70°C

Chromatographic test condition

Mobile phase: CH₃OH/H₂O=70/30; Flow rate: 1.0 ml/min; Temperature: 40°C; Detector: UV 254 nm

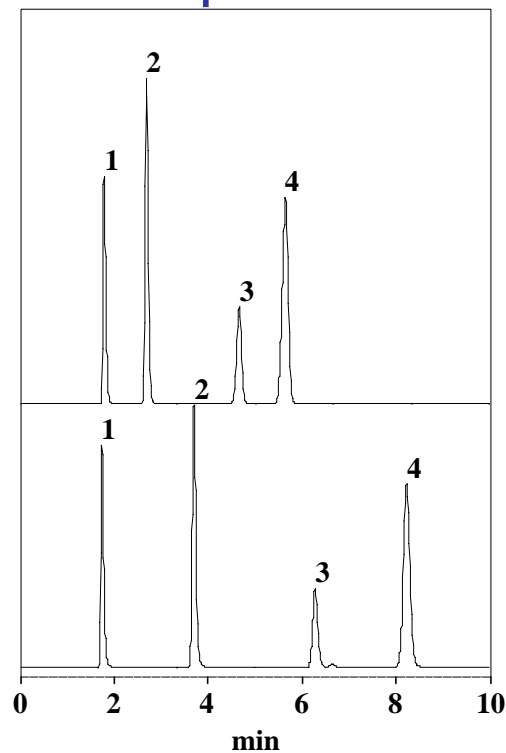
Samples: 1. Uracil, 2. Methyl Benzoate, 3. Toluene, 4. Naphthalene

SP-120-5-ODS-BIO



Competitor A

Acid purged
for 150 h



Initial

New: BIO Series: SP-200-BIO



Are you working with bigger peptides or smaller proteins?

SP-200-BIO series

The improved high density bonding and full endcapping makes it very suitable to separate or purify medium molecular weight compounds, especially **insulin**.

The C8 phases are recommended for compounds too strongly retained on ODS phases.

Available types:

SP-200-ODS-BIO, SP-200-C8-BIO, SP-200-C4-BIO

New: BIO Series: SP-200-C8-BIO



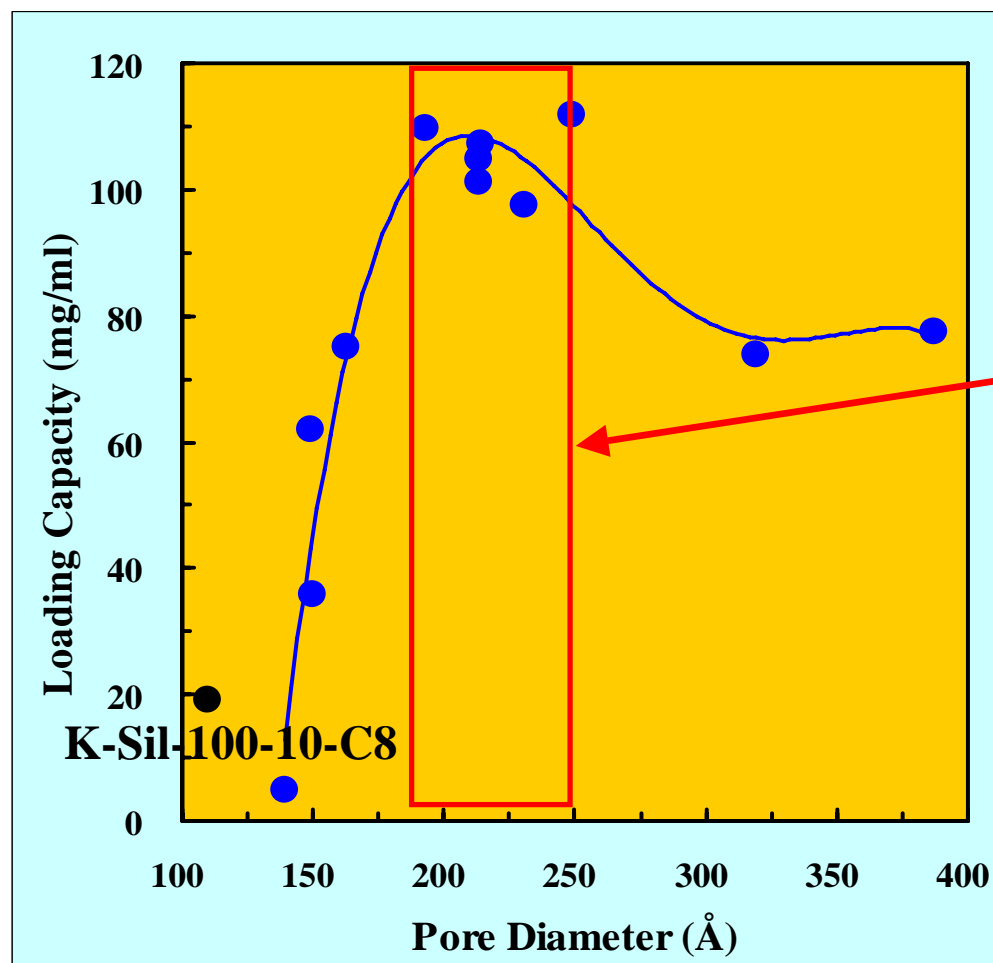
Designed for insulin purification

- **20 nm enlarged pore diameter**
Suitable for medium-weight molecules, e.g. **insulin**
- **Available in 5, 10, 15, 20 μm spherical ultra-high purity silica particles**
High resolution and excellent peak shape
Applicable for preparative purification
- **High surface bonding density (C8 > 3.5 $\mu\text{mol}/\text{m}^2$) combined with new endcapping technology (patented)**
Improvement in phase stability against extreme acidic and alkalic environments

Loading capacity for Insulin



Expanded pore diameter correlation



Optimum pore
range for
insulin molecule
19 - 25 nm

$$\text{Loading capacity} = F \times C_0 \times T_b / CV$$

F: Flow rate;

C_0 : Concentration;

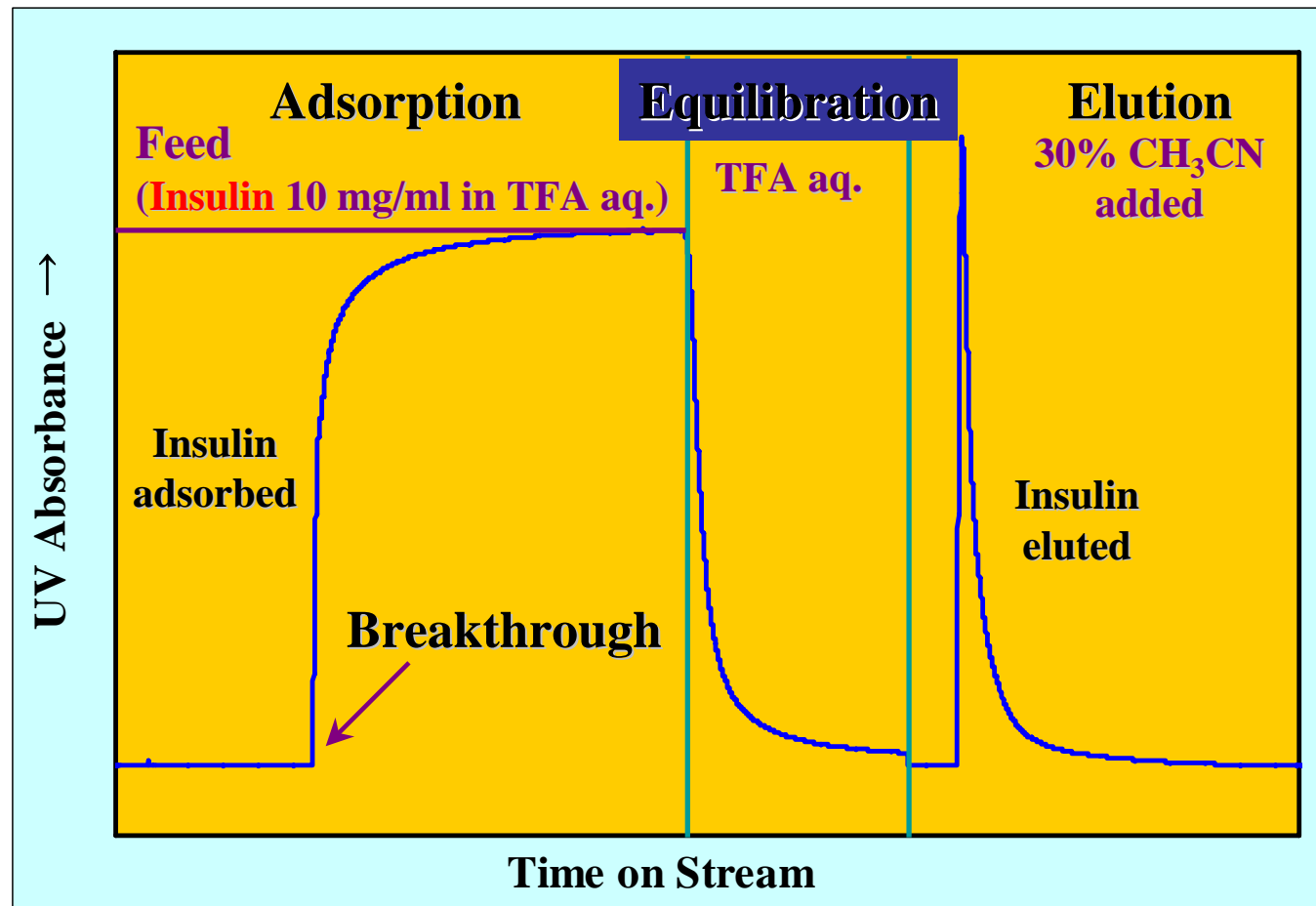
T_b : Breakthrough time;

CV: Column volume.

Loading Capacity Evaluation



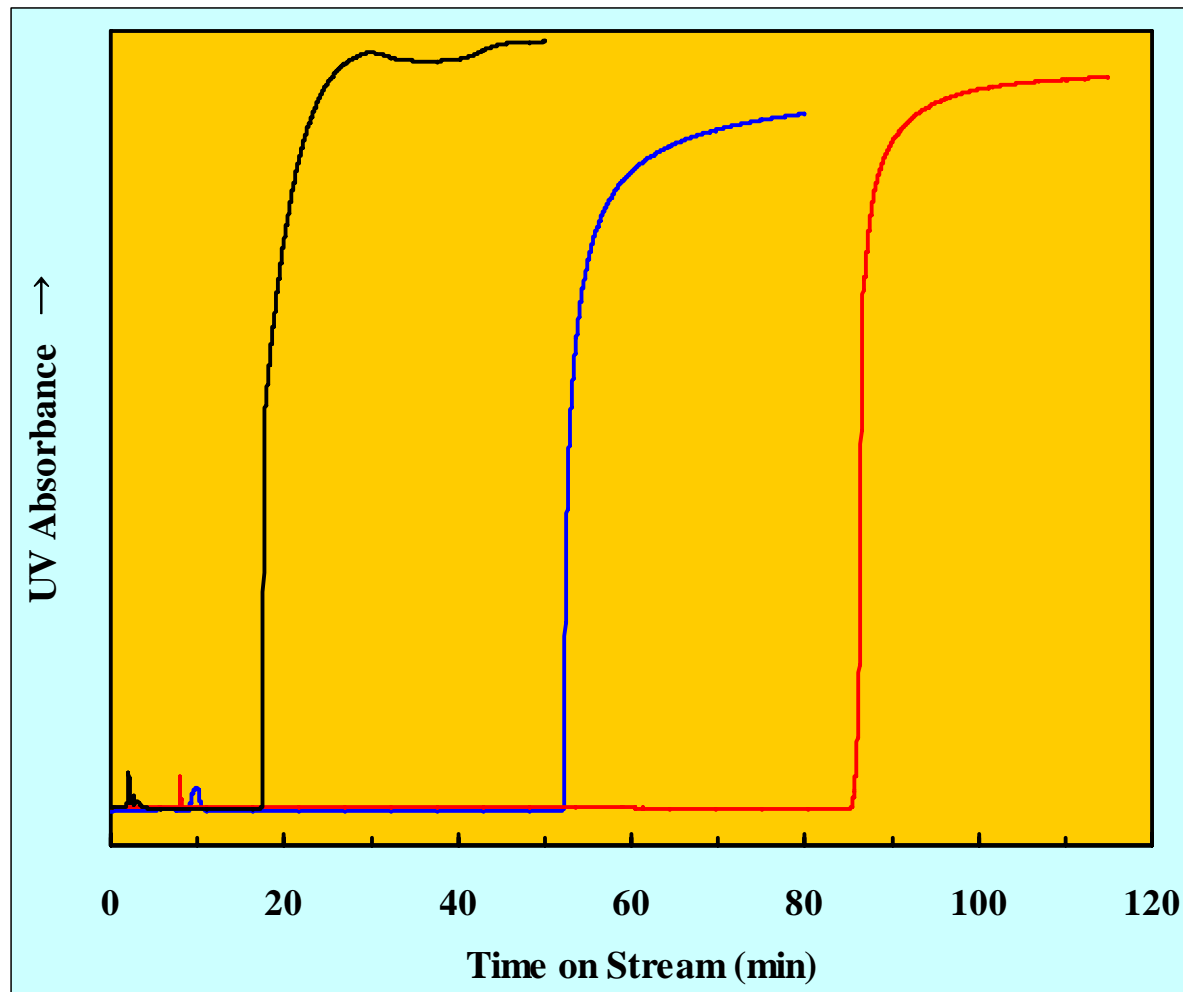
Conceptual illustration of theoretical adsorption-elution



Loading Capacity of Insulin



Breakthrough curve comparison



K-Sil-100-10-C8
SP-120-10-C8-BIO
SP-200-10-C8-BIO

BIO Series: SP-200-C8-BIO



Summary

- **SP-200-C8-BIO** exhibited the highest loading capacity for insulin estimated adsorption breakthrough point.
- The optimum pore size for insulin molecule diffusion seems to be **19 - 25 nm**.
- **SP-200-C8-BIO** also exhibited better durability in alkaline (pH=13) environment even compared with K-Sil-100-10-C8.
- **SP-200-C8-BIO** is the best packing material for **insulin** purification.

New: BIO Series: SP-300-BIO



**Are you working with proteins?
SP-300-BIO series**

The improved high density bonding and full endcapping makes it very suitable to general use and to separate or purify high molecular weight compounds, especially proteins.

The C4 phases are recommended for compounds too strongly retained on ODS and C8 phases.

Available types:

SP-300-ODS-BIO, SP-300-C8-BIO, SP-300-C4-BIO

New: BIO Series: SP-300-C4-BIO



Designed for protein purification

- **30 nm enlarged, narrow range pore diameter**
Suitable for bulky bio-molecules, e.g. proteins
- **Available in 5, 10, 15, 20 μm spherical ultra-high purity silica particles**
High resolution and excellent peak shape
Applicable for preparative purification
- **Specially designed C4 ligand configuration combined with new endcapping technology**
Higher surface bonding density (C4 > 6.0 $\mu\text{mol}/\text{m}^2$)
Improvement in phase stability against extreme acidic and alkalic environments

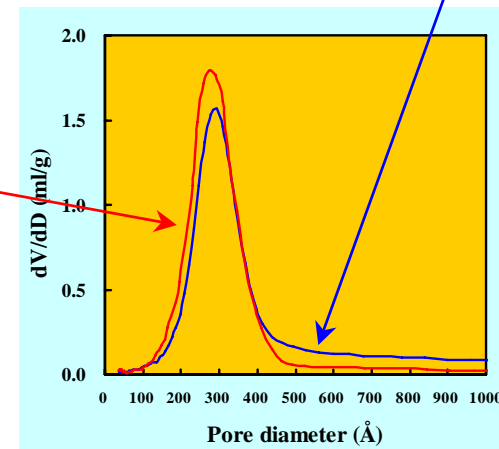
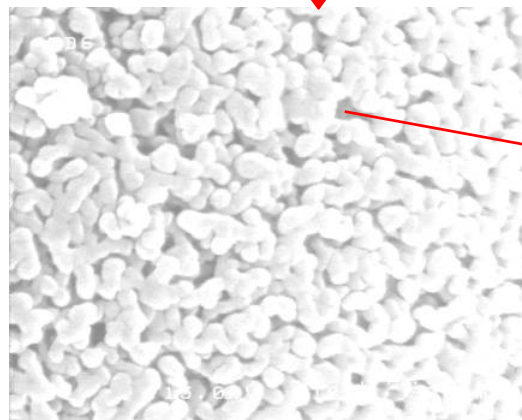
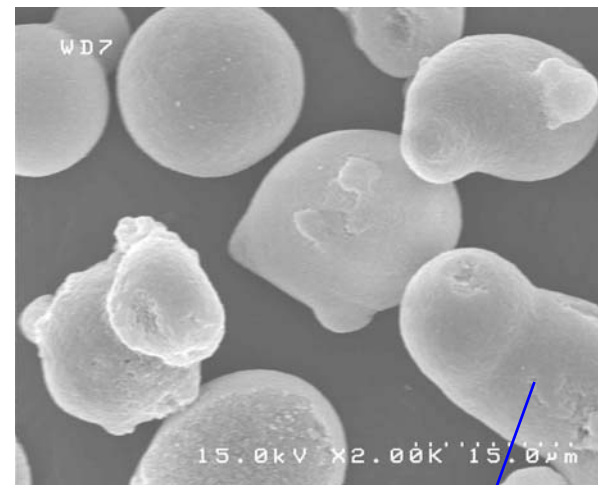
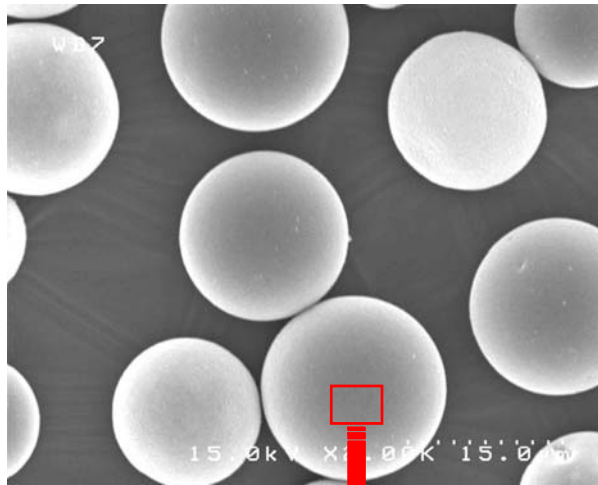
BIO Series: SP-300-P



Morphology and pore distribution

DAISOGEL SP-300-15-P

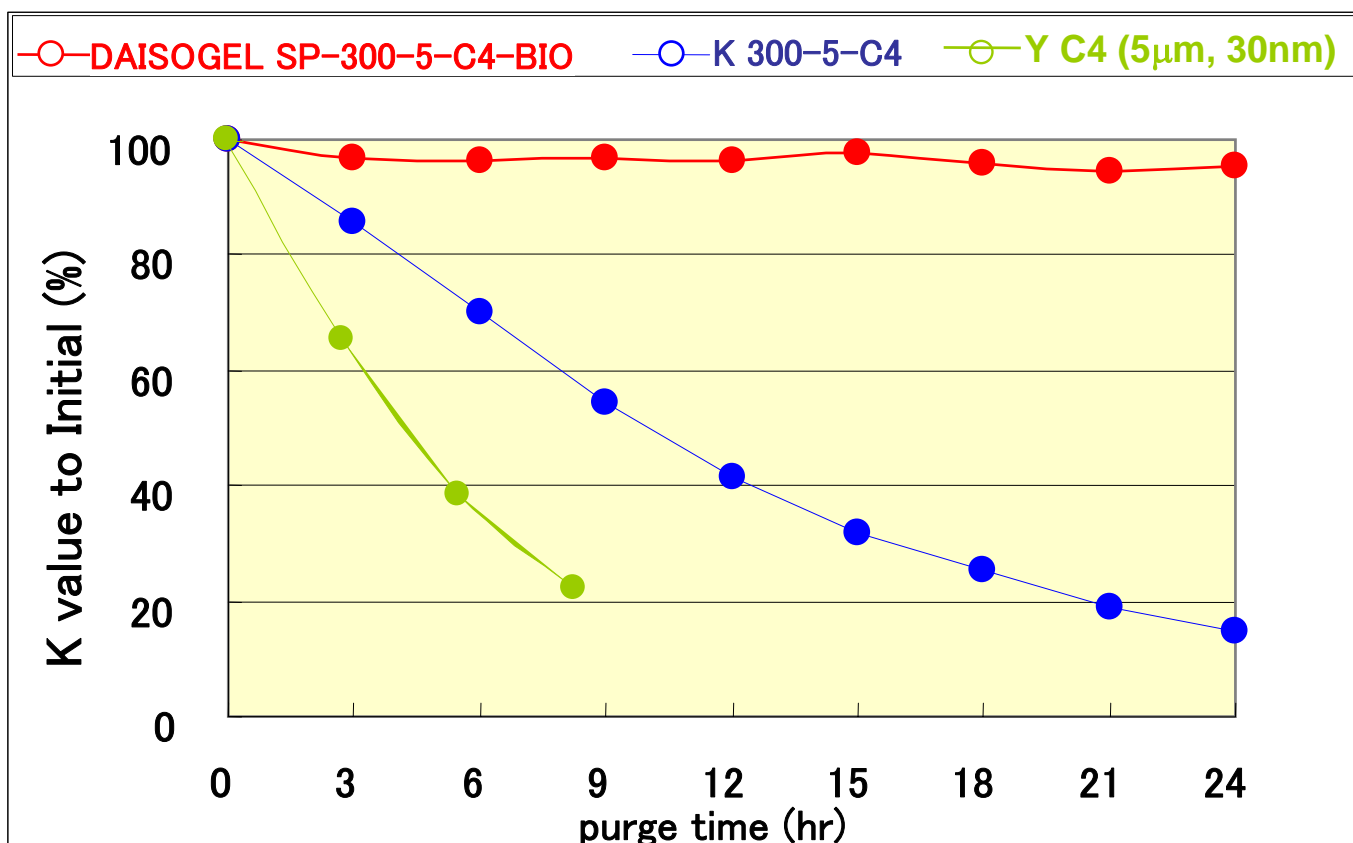
V 300-15



BIO Series: SP-300-C4-BIO



Durability comparison with K 300-5-C4 and Y C4 (5 μ m, 30nm)
in acidic environment - *K* value -



DAISOGEL
24hrs : 95.5%

K 24hrs :
14.7%

Y
9hrs : 23.2%

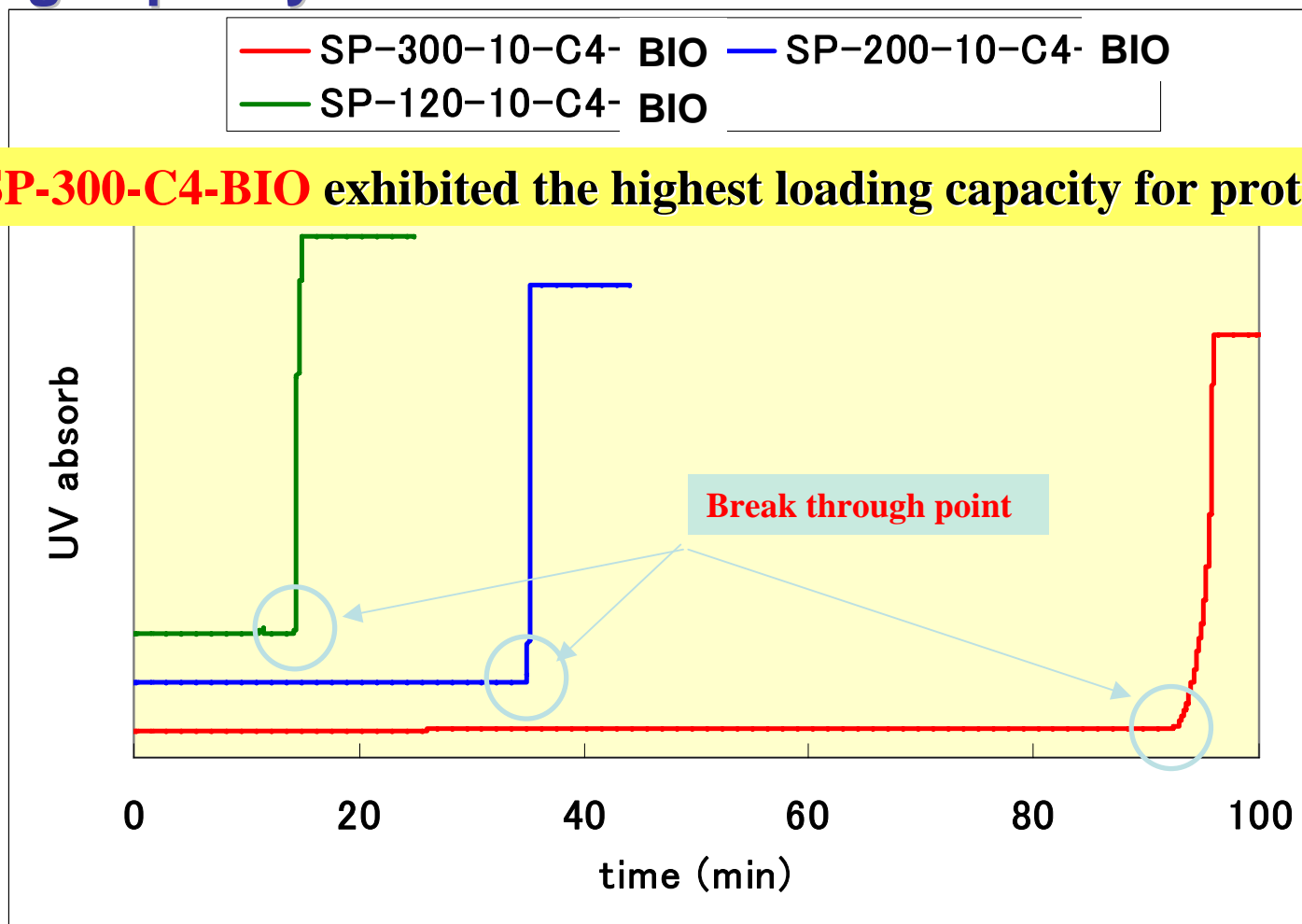
Accelerated acidic duration test condition

Mobile phase: CH₃CN/1.0% TFA aq. (pH=1.0) = 10/90; Flow rate: 1.0 ml/min; Temp.: 70°C ; Purge time: 3h

BIO Series: SP-300-C4-BIO



Loading capacity of BSA



Column: 6 mm I.D. x 250 mm length; Temperature: 35°C; Detector: UV 220 nm; Flow rate: 1.0 ml/min.
Feed : 10 mg/mL BSA in 0.1% TFAaq

Best choices: SP-120-ODS-BIO, SP-200-C8-BIO, SP-300-C4-BIO,