Selecting Packing Materials for HPLC Applications

Spherical gels are all-porous silica particles that are ideal for packing HPLC columns. Compared with resins, plastic beads and irregular silica, spherical gels are highly pure and free from surface imperfections, so they provide more homogenous packing, lower back pressure and superior separation. The high lot-to-lot consistency provides higher reproducibility of the separation process and easy scale-up. In addition, this amorphous-type silica is harmless to human health and the environment. This poster highlights important characteristics to consider when selecting packing materials.

PURITY

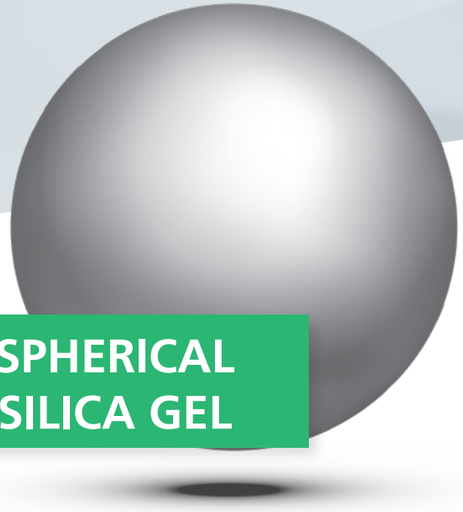
Impurities affect the HPLC performance of the column. The surface of the microspherical silica contains many, many silanol groups that can react and bond with impurities like metals. These impurities affect HPLC performance by changing the retention strength and producing badly tailing peaks. High-purity silica gels prevent this from happening.

SHAPE

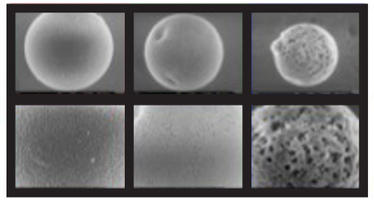
Perfectly spherical particles are free from cavities and cracks. This allows more homogenous packing into a compact form with less channeling effect, which in turn provides lower back pressure, better separation performance and longer particle life. Resin beads are spherical, but they don't have a smooth surface. For this reason, spherical gels provide better column packing and HPLC results than resin beads or irregular silica.

IRREGULAR SILICA GEL

RESIN BEAD



SPHERICAL SILICA GEL



M.S. GEL™ Silica D Silica F

Microscope images highlight the differences between M.S. GEL silica and other silica gels.

PORE STRUCTURE

It's important that the packing material you select be available in a wide variety of pore sizes so you can select the best specific surface area for your application. Also, the particles should have consistent and uniform porosity throughout, as well as a narrow pore size distribution to enable higher loading capacity. M.S. GEL™ particles are available with pore sizes of 60 – 1500 Å.

PARTICLE SIZE

Narrow particle size distribution is most suitable for preparative chromatography (from 10 – 50 µm). Consistency and repeatability mean less downtime and better analytical data. M.S. GEL has a very narrow particle size distribution and is available in sizes of 1.6 – 200 µm and specific surface areas of 30 – 900 m^2/g.

MECHANICAL STABILITY

Particles with high mechanical strength will maintain their back pressure longer after repeated column packing. Stronger particles will not deform after packing. The high strength shows good suitability for DAC column system. M.S. GEL has high mechanical stability compared with irregular silica particles and resin beads.

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