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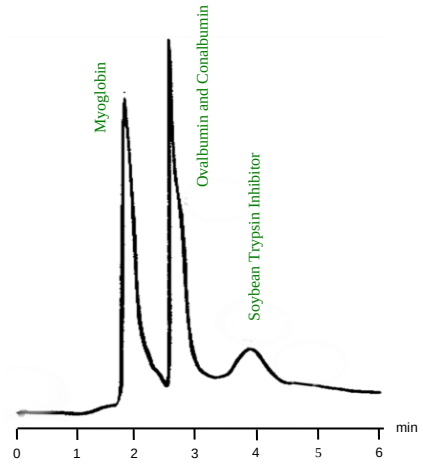
APPLICATION NOTE

Polymeric Gigaporous Anion Exchanger : Throughpores versus Superficial Pores.

Mechanical strength and release of fines should get close scrutiny when selecting porous stationary phases with pores larger than 1,000 to 2,000 A°.
Limitations in column lengths offered by the manufacturer, especially in the narrow bore and microbore categories, can be an indication of the media's lack of mechanical strength. The release of fines from the matrix however, is more challenging to identify.
An obvious result of leaching and fine release is the plugging of throughpores and the formation of long diffusive pores, similar to superficially porous beads. The following chromatogram shows the separation of 4 proteins on a polymeric strong anion exchanger with superficial diffusive pores.



Chromatogram 1.
Commercial quaternary anion exchanger with superficial pores. 4.6 x 50 mm . 4 ml/min (1,450 cm/hr)

The slow elution of peaks, as well as their poor resolution indicates the presence of long diffusive pores substantially limiting the mass transfer process.

The same separation preformed on a fully pervious gigaporous **STYROS**™ HQ strong anion exchanger under similar conditions and even higher flow rate, provides baseline separation of the major proteins:

Chromatogram 2.
STYROS™ HQ/XH with throughpores. 4.6 X 50 mm. 5ml/min (1,800 cm/hr).

The conditions are summarized in the following table.

HPLC System.	HP 1100
Columns	**STYROS**™ HQ/XH 4.6 x 50 mm
Mobile Phase	A: 20 mM Tris-HCl, pH = 8.2 B: A + 0.5 M NaCl
Flow rate	As indicated
Gradient	0 to 100 % B in 12 column volume.
Temperature	30°C
Detection	280 nm
Samples	Myoglobin, Conalbumin, Ovalbumin, Soybean Trypsin Inhibitor.

Contrary to the long diffusive pores, the throughpores are fully accessible to the eluants. This results in fast separations under moderate back-pressure.

Porous stationary phases with throughpores of 1,000 to 2,000 A°, provide access to the inner-bead that would otherwise be considered as dead volume. The resulting low pressure is another advantage of such media allowing their use with FPLC instruments as well as HPLC. It is however crucial for these type of media to be mechanically stable, do not leach or release fines that would obstruct the throughpores and generate long diffusive pores compromising the mass transfer process.