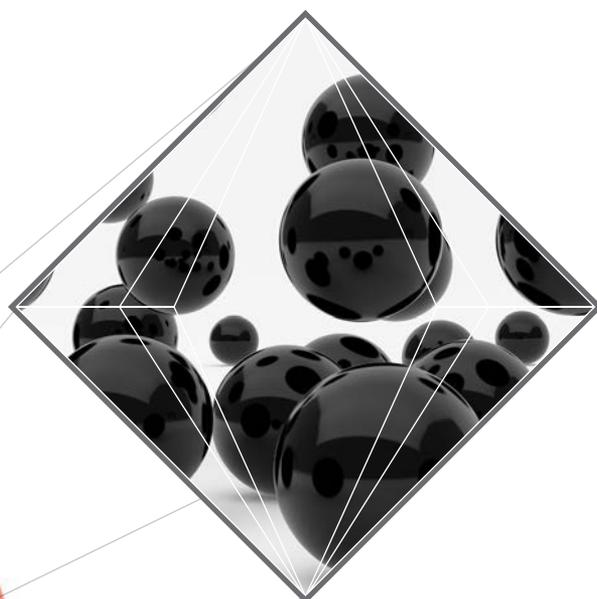


# Supelco® Specialty Carbon Adsorbents

High-Tech Materials Engineered for  
Applications of This World and Beyond!



Selection Guidelines  
Carbon Adsorbent Sampler Kits  
Carbon Molecular Sieves  
Spherical Graphitized Polymer Carbons  
Graphitized Carbon Blacks  
Custom Capabilities

Supelco has a 40+ year commitment to carbon adsorbent research and product development. Our initial work focused on understanding how thermodynamic and kinetic properties affect the performance characteristics of both existing and novel carbons. The knowledge gained from this fundamental research has led to the development of innovative new carbon adsorbents with significant advances in performance.

The unique and valuable characteristics of our specialty carbon adsorbents warranted their inclusion in experiments onboard the 1977 Voyager 1 mission through our solar system, the 1995 Galileo mission to Jupiter, the 2005 Cassini-Huygens missions to Saturn and its largest moon Titan, the 2008 Phoenix mission to Mars, and the International Space Station.

Back here on Earth, our specialty carbon adsorbents are used for:

- Collection media in air sampling devices
- Packings in SPE hardware, purge traps, and GC columns
- Purification of gas or liquid streams
- Recovery of synthesized compounds from reaction mixtures

Another area of interest is the use of mesoporous nanocarbons in supercapacitor research.

## What is a “Specialty Carbon Adsorbent”?

A graphic depicting a spherical particle is shown in **Figure 1**. A pore can be defined as any cavity present on a solid surface with a depth:width ratio of ~10:1. There are three types of pores relevant to carbon adsorbents. A macropore has a >500 Å diameter, a mesopore has a 20–500 Å diameter, and a micropore has a <20 Å diameter. Controlling pore composition is very important as it determines the adsorption and desorption characteristics of the particle.

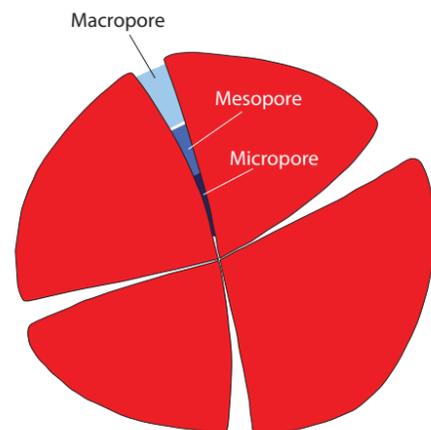


Figure 1. Spherical Particle

Unlike non-specific, low-tech carbon black and activated carbon adsorbents, our specialty carbon adsorbents are highly engineered materials, many manufactured from highly pure synthetic polymers. They can be designed with:

- The shape we want, either spherical or granular
- No pores, or more/less of any pore type to serve a specific purpose
- Tapered pores (from macro- to meso- to micro-) which increases thermodynamic and kinetic efficiency
- A through-pore or closed-pore structure, which influences microporous strength and kinetic effectiveness
- Surface pH adjustments, as low as 2.5 to as high as 10.5

Today, we make over 30 different specialty carbon adsorbents ranging in particle size from <0.2 to 850 µm and surface areas from 5 to 1,500 m<sup>2</sup>/g. Any modifications (activation, oxidation, graphitization, surface pH adjustment, etc.) are accomplished through physical means, not chemical means. Our full line of specialty carbon adsorbents includes Carbon Molecular Sieve (CMS), Spherical Graphitized Polymer Carbon (SGPC), and Graphitized Carbon Black (GCB) adsorbents. We also offer sampler kits, a cost-effective way to evaluate several of our specialty carbon adsorbents.

## Physical Characteristics

The approximate surface area, pore volume, pore diameter, micropore diameter, and free fall density for each of our specialty carbon adsorbents can be found in **Table 2**. Also indicated is the type of adsorbent (CMS, SGPC, GCB, etc.), the shape (spherical or granular), and whether it is scalable. If scalable, the approximate pH is also listed. Included are all our Carboxen®, Carbosieve®, Graphsphere™, Carbotrap®, and Carbopack™ adsorbents.

## General Selection Guidelines

To assist with adsorbent selection, **Table 1** lists some general guidelines based on analyte size relative to n-alkanes. It is important to consider all atoms, not just carbon. For example, 1,2-dichloroethane is a C<sub>2</sub>, but the two chlorine atoms give it a relative size between butane (C<sub>4</sub> n-alkane) and pentane (C<sub>5</sub> n-alkane). If a specialty carbon adsorbent is exposed to analytes larger than designed for, the analytes may become irreversibly adsorbed. This results in the loss of adsorption ability, and shortens life time.

Some applications may require more than one bed of specialty carbon adsorbent to handle multiple analytes over a wide size range. Examples include air sampling tubes and purge traps. For any multi-bed application, it is important to design the device so that the sample contacts the weaker adsorbent(s) before the stronger adsorbent(s). This serves to protect the stronger adsorbent(s). An example three-bed device for C<sub>2</sub>–C<sub>20</sub> sized analytes would position Carbotrap C first, Carbotrap B second, and Carboxen 569 last. If desorption is required, it is equally important to do so in the reverse direction.

**Table 1. Carbon Adsorbent Selection Based on Relative Analyte Size**

Relative Analyte Size <sup>1</sup>	Adsorptive Strength	Recommended Adsorbents (listed highest to lowest surface area)
C <sub>2</sub> –C <sub>5</sub>	Strongest	Carboxen 1012, Carboxen 1034, Carboxen 1000, Carboxen 1008, Carboxen 1026, Carbosieve G, Carboxen 1005, Carboxen 572, Carbosieve S-II, Carboxen 1003, Carbosieve S-III, Carboxen 1032, Carboxen 1030, Carboxen 1006, Carboxen 1018, Carboxen 1010, Carboxen 1021, Carboxen 563, Carboxen 1001, Carboxen 569, Carboxen 1033, Carboxen 564
C <sub>3</sub> –C <sub>9</sub>		Carbotrap X, Carbopack X, Carbopack Z
C <sub>5</sub> –C <sub>12</sub>		Graphsphere 2027, Graphsphere 2029, Carbotrap B, Carbopack B, Graphsphere 2016, Graphsphere 2017
C <sub>9</sub> –C <sub>14</sub>		Carbotrap Y, Carbopack Y
C <sub>12</sub> –C <sub>20</sub>		Carbotrap C, Carbopack C
C <sub>20</sub> +	Weakest	Carbotrap F, Carbopack F

1. Analyte size relative to n-alkanes. Consider all atoms, not just carbon. For example, even though 1,2-dichloroethane is a C<sub>2</sub>, the two chlorine atoms give it a relative analyte size between C<sub>4</sub> and C<sub>5</sub>.

## Scalable Adsorbents

Sixteen of our specialty carbon adsorbents are scalable, as indicated in **Table 2**, signifying that we can produce large amounts (>1,000 Kg annually) of these adsorbents in 20/40, 20/45, or 30/45 mesh. If you are investigating a specialty carbon adsorbent for a purification or recovery application, we recommend that you focus on the sixteen that are scalable to ensure we can meet your demand if one is found to be satisfactory. Suitable uses in the petrochemical, pharmaceutical, food and beverage, environmental, and other industries include:

- Purification applications. An interference removal technique is used to remove an impurity or impurities from a gas or liquid stream. An example is the purification of industrial gases/solvents, effluent streams, or raw materials.
- Recovery applications. A bind and elute technique is employed to first capture a compound or compounds from a gas or liquid, and then to recover the compound or compounds. Recovery can be through thermal or solvent desorption. An example is the recovery of a synthesized compound from a reaction mixture.

## Carbon Adsorbent Sampler Kits

Choosing the right adsorbent or combination of adsorbents can be difficult:

- Must choose one or more to retain specific analyte(s)
- May be equally important to release analyte(s) during desorption

We offer several convenient sampler kits, which allow a cost-effective way to evaluate several of our specialty carbon adsorbents. The composition of each kit can be found in **Table 3**. Kit recommendations based on several applications are described in **Table 4**. Once you find an adsorbent or adsorbents that serve your purpose, we will work with you to either make your device for you, or to supply you bulk adsorbent (in a bottle, jar, or ampule; not packed inside a device). Note that the purchase of any kit is limited to two per customer per calendar year.



Table 3. Kit Catalog Numbers, Names, and Components

		Kit <sup>1</sup>							
13028-U <sup>2</sup>	13369-U <sup>2</sup>	13384-U <sup>2</sup>	13027-U <sup>2</sup>	13026-U <sup>2</sup>					
CMS/SGPC I	CMS/SGPC II	SGPC	20/40 GCB	60/80 GCB	Adsorbent Name	Adsorbent Type			Scalable <sup>3</sup>
						CMS	SGPC	GCB	
	20/45				Carboxen® 563	X			Y
	20/45				Carboxen 564	X			Y
20/45	20/45				Carboxen 569	X			Y
	20/45				Carboxen 572	X			Y
60/80					Carboxen 1000	X			
	20/45				Carboxen 1005	X			Y
80/120					Carboxen 1012	X			
60/80					Carboxen 1018	X			
60/80					Carboxen 1021	X			
	20/45				Carboxen 1032	X			Y
	20/45				Carboxen 1033	X			Y
	20/45				Carboxen 1034	X			Y
60/80					Carbosieve® G	X			
60/80					Carbosieve S-III	X			
60/80		60/80			Graphsphere™ 2016		X		
	20/45	30/45			Graphsphere 2017		X		Y
		50-60 µm			Graphsphere 2027		X		
		120/400			Graphsphere 2029		X		
			20/40		Carbotrap® B			X	Y
			20/40		Carbotrap C			X	Y
			20/40		Carbotrap F			X	Y
			20/40		Carbotrap X			X	Y
			20/40		Carbotrap Y			X	Y
				60/80	Carbopack™ B			X	
				60/80	Carbopack C			X	
				60/80	Carbopack F			X	
				60/80	Carbopack X			X	
				60/80	Carbopack Y			X	
				60/80	Carbopack Z			X	

1. Particle size listed in mesh unless otherwise specified.

2. Kit contains 5 g of each of the specified adsorbents in a separate bottle.

3. Scalable = We can produce large amounts (>1,000 Kg annually) of this adsorbent in 20/40, 20/45, or 30/45 mesh.

Table 4. Kit Selection Based on Application

Application	Kit <sup>4</sup>				
	13028-U	13369-U	13384-U	13027-U	13026-U
	CMS/SGPC I	CMS/SGPC II	SGPC	20/40 GCB	60/80 GCB
Collection media in air sampling device	X	X	X	X	X
Packing in SPE hardware	X		X		X
Packing in purge trap	X		X		X
Packing in GC column	X		X		X
Purification of gas or liquid stream <sup>5</sup>		X		X	
Recovery of synthesized compound from reaction mixture <sup>5</sup>		X		X	

4. Purchase of any kit is limited to two per customer per calendar year.

5. We recommend you use a kit which contains scalable adsorbents to ensure we can meet your demand if you find one or more that meets your needs.

## Carbon Molecular Sieve (CMS) Adsorbents

A carbon molecular sieve (CMS) is the porous carbon skeletal framework that remains after pyrolysis of a polymeric precursor. These particles are:

- Spherical (better packed bed performance than granular particles)
- Hard and non-friable (pack well, will not break)
- Highly porous (high surface areas)
- Used for molecules with an analyte size relative to C2–C5 n-alkanes
- Hydrophobic (can be used in high humidity environments)

Generally, CMS adsorbents offer greater relative adsorptive strength compared to spherical graphitized polymer carbon (SGPC) and graphitized carbon black (GCB) adsorbents. We offer two product lines; Carboxen adsorbents (have tapered pores) and Carbosieve adsorbents (have non-tapered pores). Physical characteristics and available particle sizes for all our specialty carbon adsorbents are shown in **Table 1** (page 4). Choosing an adsorbent based on relative analyte size is explained in **Table 2** (page 6).

### Carboxen® Adsorbents

- Have tapered pores, resulting in excellent thermodynamic properties for both adsorption and desorption (have the best thermodynamic performance of any adsorbents)
- The surface chemistry can be tailored for specific target analytes
- We make nineteen Carboxen adsorbents
  - **Carboxen 563** has a closed-pore structure. It is useful for collecting volatile organic compounds (VOCs) from water or air.
  - **Carboxen 564** has a closed-pore structure. It is effective for collecting VOCs from air. It has a greater capacity than Carboxen 563.
  - **Carboxen 569** has a closed-pore structure. This is a highly hydrophobic adsorbent, making it useful for sampling in high humidity environments. Relative to Carboxen 563 and Carboxen 564, it has a greater capacity for organic molecules and a lower capacity for water.
  - **Carboxen 572** has a through-pore structure. This highly efficient CMS adsorbent compares directly to Carboxen 1000. The primary difference between Carboxen 572 and Carboxen 1000 is the particle size distribution (Carboxen 572 is only available in 20/45 mesh whereas Carboxen 1000 is available in 40/60, 60/80, and 80/100 mesh).
  - **Carboxen 1000** has a through-pore structure. It has a large surface area and optimized microporosity, which enable it to effectively and efficiently adsorb and desorb smaller molecular size compounds. One of our most efficient CMS adsorbents, it is widely used in air sampling devices and purge traps, and also GC columns because it provides excellent chromatography without a need for cryogenic cooling. It is also used for low volume sampling of very volatile compounds, such as vinyl chloride.

- **Carboxen 1001** has a closed-pore structure. It is used to trap and retain very small compounds. It is often used as the final bed in multi-bed adsorbent tubes, to minimize breakthrough. It is similar to Carboxen 569 in strength and hydrophobicity. Note that bulk Carboxen 1001 adsorbent is only available as a custom item.
- **Carboxen 1003** has a through-pore structure. Its large surface area and hydrophobic surface characteristics provide a desirable combination of efficient adsorption/desorption and good hydrophobicity.
- **Carboxen 1005** has a through-pore structure. It is based on Carboxen 1003 adsorbent. With twice the trapping ability compared to active charcoal, it is primarily used in gas purification applications to retain hydrocarbons. Note that bulk Carboxen 1005 adsorbent is only available as a custom item.
- **Carboxen 1006** has a through-pore structure. It is only available as 2 µm particles. It is used as an adsorbent in porous layer open tubular (PLOT) capillary GC columns. Note that bulk Carboxen 1006 adsorbent is only available as a custom item.
- **Carboxen 1008** has a through-pore structure. It is a washed version of Carboxen 1000, designed for use as an adsorbent in air collection devices. Note that bulk Carboxen 1008 adsorbent is only available as a custom item.
- **Carboxen 1010** has a through-pore structure. Only available as 2 µm particles, it is used as an adsorbent in PLOT capillary GC columns. Note that bulk Carboxen 1010 adsorbent is only available as a custom item.
- **Carboxen 1012** has a through-pore structure. It is a highly activated, inert CMS possessing great mesoporosity. It can be used effectively for aqueous phase adsorption of organic compounds, or for air sampling of C4–C6 compounds. Note that bulk Carboxen 1012 adsorbent is only available as a custom item.
- **Carboxen 1018** has a through-pore structure. Possessing a large percentage of narrow (6–7 Å) micropores, it is useful for the adsorption/desorption of small analytes, such as C2 (ethane, ethylene, acetylene) and C3 hydrocarbons. This hydrophobic, inert, and strong adsorbing porous carbon can be used in sampling tubes to collect ethane, acetaldehyde, and other small molecules present in exhaled breath samples. Note that bulk Carboxen 1018 adsorbent is only available as a custom item.
- **Carboxen 1021** has a through-pore structure. It is a highly-microporous CMS designed for air sampling of small molecules. It is similar to Carboxen 1018 in that it has a large percentage of small micropores. Compared to Carboxen 1018, it has smaller micropores (5–6 Å), and is more hydrophobic. Note that bulk Carboxen 1021 adsorbent is only available as a custom item.

- **Carboxen® 1026** has a through-pore structure. It is our most microporous CMS, used as an adsorbent in solid phase extraction (SPE) applications. Note that bulk Carboxen 1026 adsorbent is only available as a custom item.
- **Carboxen 1030** has a through-pore structure. It is designed as a scalable adsorbent with an acidic pH for purification and recovery applications. Note that bulk Carboxen 1030 adsorbent is only available as a custom item.
- **Carboxen 1032** has a through-pore structure. It is designed as a scalable adsorbent with an acidic pH for purification and recovery applications. It is similar to Carboxen 1030, but is more acidic and has a greater mesoporous volume. Note that bulk Carboxen 1032 adsorbent is only available as a custom item.
- **Carboxen 1033** has a through-pore structure. It is designed as a scalable adsorbent with a neutral pH for purification and recovery applications. Note that bulk Carboxen 1033 adsorbent is only available as a custom item.
- **Carboxen 1034** has a through-pore structure, and high surface area. It is designed as a scalable adsorbent with a basic pH for purification and recovery applications. Note that bulk Carboxen 1034 adsorbent is only available as a custom item.

#### Carbosieve® Adsorbents

- Have non-tapered pores
- Very strong adsorptive strength due to only containing micropores
- Provide great performance for many small, volatile analytes that most adsorbents have trouble retaining
- We make three Carbosieve adsorbents
  - **Carbosieve G** has a through-pore structure. It is mainly used in GC columns for analyzing C1–C3 hydrocarbons.
  - **Carbosieve S-II** has a through-pore structure. It is mainly used in GC columns for analyzing mixtures of permanent gases (oxygen, nitrogen, carbon monoxide, and carbon dioxide) and C1–C2 hydrocarbons (methane, ethane, ethylene, and acetylene).
  - **Carbosieve S-III** has a closed-pore structure. It is excellent for trapping small airborne molecules, such as chloromethane. Although hydrophobic, it retains slightly more water during sampling than does Carboxen 569.

#### Spherical Graphitized Polymer Carbon (SGPC) Adsorbents

A spherical graphitized polymer carbon (SGPC) has an innovative structure; a porous or non-porous core (the carbon framework that remains after pyrolysis of polymeric precursor), and a graphitized shell of a controlled thickness. The graphitization process results in a highly pure surface with great adsorption and desorption (if required) properties. Surface interactions depend solely on dispersion (London) forces. These amorphous/graphitic adsorbents are:

- Spherical (better packed bed performance than granular particles)
- Hard and non-friable (pack well, will not break)
- Used for molecules with an analyte size relative to C5–C12 n-alkanes
- Hydrophobic (can be used in high humidity environments)

Generally, SGPC adsorbents offer weaker relative adsorptive strength compared to carbon molecular sieve (CMS) adsorbents, and similar relative adsorptive strength compared to graphitized carbon black (GCB) adsorbents. We offer one product line, Graphsphere™ adsorbents, which are great alternatives to GCB adsorbents (which are granular and friable). Physical characteristics and available particle sizes for all our specialty carbon adsorbents are shown in **Table 2** (page 4). Choosing an adsorbent based on relative analyte size is explained in **Table 1** (page 3). We make four Graphsphere adsorbents.

- **Graphsphere 2016** (formally Carboxen 1016) is non-porous. Its adsorptive strength is slightly stronger than that of Graphsphere 2017.
- **Graphsphere 2017** (formally Carboxen 1017) is non-porous. This highly engineered material has traveled to space on several missions, used to collect samples for evolved gas analysis. Note that bulk Graphsphere 2017 material is only available as a custom item.
- **Graphsphere 2027** (formally Carboxen 1027) has a closed-pore structure. It has large (173 Å) pores, and a narrow particle size range (50–60 µm). Note that bulk Graphsphere 2027 material is only available as a custom item.
- **Graphsphere 2029** (formally Carboxen 1029) has a closed-pore structure. It has large (180 Å) pores, and is used as an adsorbent in solid phase extraction (SPE) applications. Note that bulk Graphsphere 2029 material is only available as a custom item.

#### Graphitized Carbon Black (GCB) Adsorbents

A graphitized carbon black (GCB) can be non-porous or porous. The graphitization process results in a highly pure surface with great adsorption and desorption (if required) properties. Surface interactions depend solely on dispersion (London) forces. These particles are:

- Granular
- Friable
- Used for molecules with an analyte size relative to C3–C20+ n-alkanes
- Hydrophobic (can be used in high humidity environments)

Generally, GCB adsorbents offer weaker relative adsorptive strength compared to carbon molecular sieve (CMS) adsorbents, and similar relative adsorptive strength compared to spherical graphitized polymer carbon (SGPC) adsorbents. We offer three product lines; Carbotrap adsorbents (particles are 20/40 mesh), Carbopack adsorbents (particles are smaller than 40 mesh), and small particle GCB adsorbents (suitable for use in electrochemical and bioprocessing applications). Physical characteristics and available particle sizes for all our specialty carbon adsorbents are shown in **Table 2** (page 4). Choosing an adsorbent based on relative analyte size is explained in **Table 1** (page 3).

#### Carbotrap® Adsorbents

- Particles are 20/40 mesh
- These large particles allow high flow rates without excessive pressure drops
- We make five Carbotrap adsorbents, the relative adsorptive strength from strongest to weakest is X, B, Y, C, and F
  - **Carbotrap C** and **Carbotrap B** are the most widely used. This is partly because they were introduced the earliest and partly because they complement one another very well in the analyte size range each can effectively trap/release.
  - **Carbotrap F** was introduced to extend the analyte size range that can be effectively trapped/released. This adsorbent exhibits some overlap to C. Note that bulk Carbotrap F adsorbent is only available as a custom item.
  - **Carbotrap Y** provides an analyte size range that can be effectively trapped/released that overlaps both the low end of C and the high end of B.

- **Carbotrap X** is unlike other GCBs because it is porous (has a closed-pore structure). With the greatest adsorptive strength of our GCBs, it provides a unique bridge between the GCB and CMS adsorbents.

#### Carbopack™ Adsorbents

- Particles are 40 mesh and smaller
- Use 40/60 mesh to prevent channeling (if observed with a 20/40 Carbotrap adsorbent)
- Use smaller mesh (60/80, 80/100, etc.) for all other applications
- Use the smallest particle size available as long as the application can handle the pressure drop
- We make six Carbopack adsorbents, the relative adsorptive strength from strongest to weakest is X, Z, B, Y, C, and F
  - **Carbopack C** and **Carbopack B** are the most widely used. This is partly because they were introduced the earliest and partly because they complement one another very well in the analyte size range each can effectively trap/release.
  - **Carbopack F** and **Carbopack Z** were introduced to extend the analyte size range that can be effectively trapped/released. These adsorbents exhibit some overlap to C or B, respectively. Note that bulk Carbopack F adsorbent is only available as a custom item.
  - **Carbopack Y** provides an analyte size range that can be effectively trapped/released that overlaps both the low end of C and the high end of B.
  - **Carbopack X** is unlike other GCBs because it is porous (has a closed-pore structure). With the greatest adsorptive strength of our GCBs, it provides a unique bridge between the GCB and CMS adsorbents.

#### Small Particle GCB Adsorbents

- Suitable for use in electrochemical and bioprocessing applications
- We make two small particle GCB adsorbents
  - **Mesoporous Carbon** (P/N 14030-U) is a small particle size (40–50 µm) GCB based on the Carbopack X material. Therefore, it has similar physical characteristics.
  - **Graphitized Carbon Black** (P/N 14029-U), with a particle size <200 nm, is considered a nanocarbon.

## Custom Capabilities

All of our specialty carbon adsorbents are developed and manufactured in-house at our Supelco facility in Bellefonte, Pennsylvania (USA) by very knowledgeable R&D and Manufacturing groups. Our capacity levels and extensive knowledge allow us the possibility to offer:

- Finished goods (air sampling devices, SPE tubes, purge traps, GC columns, etc.) which contain specialty carbon adsorbent, built to your specifications (including any packaging and labeling requirements)
- Any non-stock adsorbent used by Supelco to manufacture another Supelco product (air sampling device, SPE tube, purge trap, GC column, etc.) – these are signified by a yellow box in **Table 2** (page 4)
- A different package size of a stock adsorbent – these are listed in the **Ordering** section (page 11)
- A different mesh of an existing adsorbent – anything listed in **Table 2** (page 4)
- A new adsorbent – something not listed in **Table 2** (page 4)
- Processing (purification, graphitization, screening, etc.) of a non-Supelco GCB or carbon black (CB) adsorbent

If you are interested in a new adsorbent and know the target physical specifications (surface area, porosity, pore diameter, particle size range, etc.), let us know and we can investigate the possibility of manufacturing it. However, most requests are for a specialty carbon adsorbent to perform a specific task. In this case, let us know what the sample is (describe the gas or liquid), what you want to grab, and if you need to recover it afterwards. Our R&D group will investigate whether an existing adsorbent is appropriate, or if a new adsorbent needs to be developed.

Our custom capabilities include several packaging options. We can package adsorbents in clear or amber glass bottles containing 5 g to 1 Kg of an adsorbent, poly-lined pails containing 1 to 5 Kg of an adsorbent, or poly-lined fiber drums containing 1 to 20 Kg of an adsorbent. We can further package glass bottles into boxes containing foam inserts to consolidate multiple units in a secure package. Lastly, we can place multiple boxes, pails, or drums on pallets for ease of shipping. Our worldwide distribution network and global warehouses locations means we can deliver adsorbent where you need it, when you need it.

All requests for custom specialty carbon adsorbents are screened. This often involves representatives from the Marketing, R&D, and Manufacturing groups, and may require a conference call with you to discuss your exact application and expectations. To inquire about a custom specialty carbon adsorbent, please email: [supelco\\_quotes@sial.com](mailto:supelco_quotes@sial.com)



## Ordering Information

Description	Package Size	Cat. No.
<b>Carbon Adsorbent Sampler Kits</b>		
CMS/SGPC Kit I	Kit of 8 bottles	13028-U
CMS/SGPC Kit II	Kit of 9 bottles	13369-U
SGPC Kit	Kit of 4 bottles	13384-U
20/40 GCB Kit	Kit of 5 bottles	13027-U
60/80 GCB Kit	Kit of 6 bottles	13026-U
<b>Carboxen® – Carbon Molecular Sieve (CMS) Adsorbents</b>		
20/45 Carboxen 563	10 g	10263
20/45 Carboxen 564	10 g	10264
20/45 Carboxen 564	144 ampules of 290 mg	11324-U
20/45 Carboxen 569	10 g	10269
20/45 Carboxen 569	500 g	11048-U
20/45 Carboxen 572	10 g	11072-U
40/60 Carboxen 1000	50 g	10477-U
60/80 Carboxen 1000	10 g	10478-U
80/100 Carboxen 1000	100 g	11052-U
40/60 Carboxen 1003	10 g	10471
2 µm Carboxen 1006	20 g	11041-U
<b>Carbosieve® – Carbon Molecular Sieve (CMS) Adsorbents</b>		
45/60 Carbosieve G	5 g	10197
60/80 Carbosieve G	5 g	10198
80/100 Carbosieve G	5 g	10199
60/80 Carbosieve S-II	10 g	10189
80/100 Carbosieve S-II	10 g	10190-U
60/80 Carbosieve S-III	10 g	10184

Description	Package Size	Cat. No.
<b>Graphsphere™ – Spherical Graphitized Polymer Carbon (SGPC) Adsorbents</b>		
60/80 Graphsphere 2016	10 g	11021-U
<b>Carbotrap® – Graphitized Carbon Black (GCB) Adsorbents</b>		
20/40 Carbotrap B	10 g	20287
20/40 Carbotrap B	144 ampules of 190 mg	11325-U
20/40 Carbotrap C	10 g	20309
20/40 Carbotrap C	500 g	11047-U
20/40 Carbotrap X	10 g	10435-U
20/40 Carbotrap Y	10 g	10460-U
<b>Carbopack™ – Graphitized Carbon Black (GCB) Adsorbents</b>		
60/80 Carbopack B	10 g	20273
60/80 Carbopack C	10 g	10257
80/100 Carbopack C	10 g	10258
40/60 Carbopack X	10 g	10436
60/80 Carbopack X	10 g	10437-U
120/400 Carbopack X	50 g	10439-U
40/60 Carbopack Y	10 g	10461-U
60/80 Carbopack Y	10 g	10462
120/400 Carbopack Y	50 g	10464-U
60/80 Carbopack Z	10 g	11051-U
<b>Small Particle Graphitized Carbon Black (GCB) Adsorbents</b>		
45 µm Mesoporous Carbon	50 g	14030-U
<200 nm Graphitized Carbon Black	50 g	14029-U
<b>Small Particle Carbon Black (CB) Adsorbents</b>		
<200 nm Purified Carbon Black	50 g	14028-U



Visit our specialty carbon adsorbent resources at [sigma-aldrich.com/carbon](https://sigma-aldrich.com/carbon)

## Sigma-Aldrich® Worldwide Offices

### Argentina

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