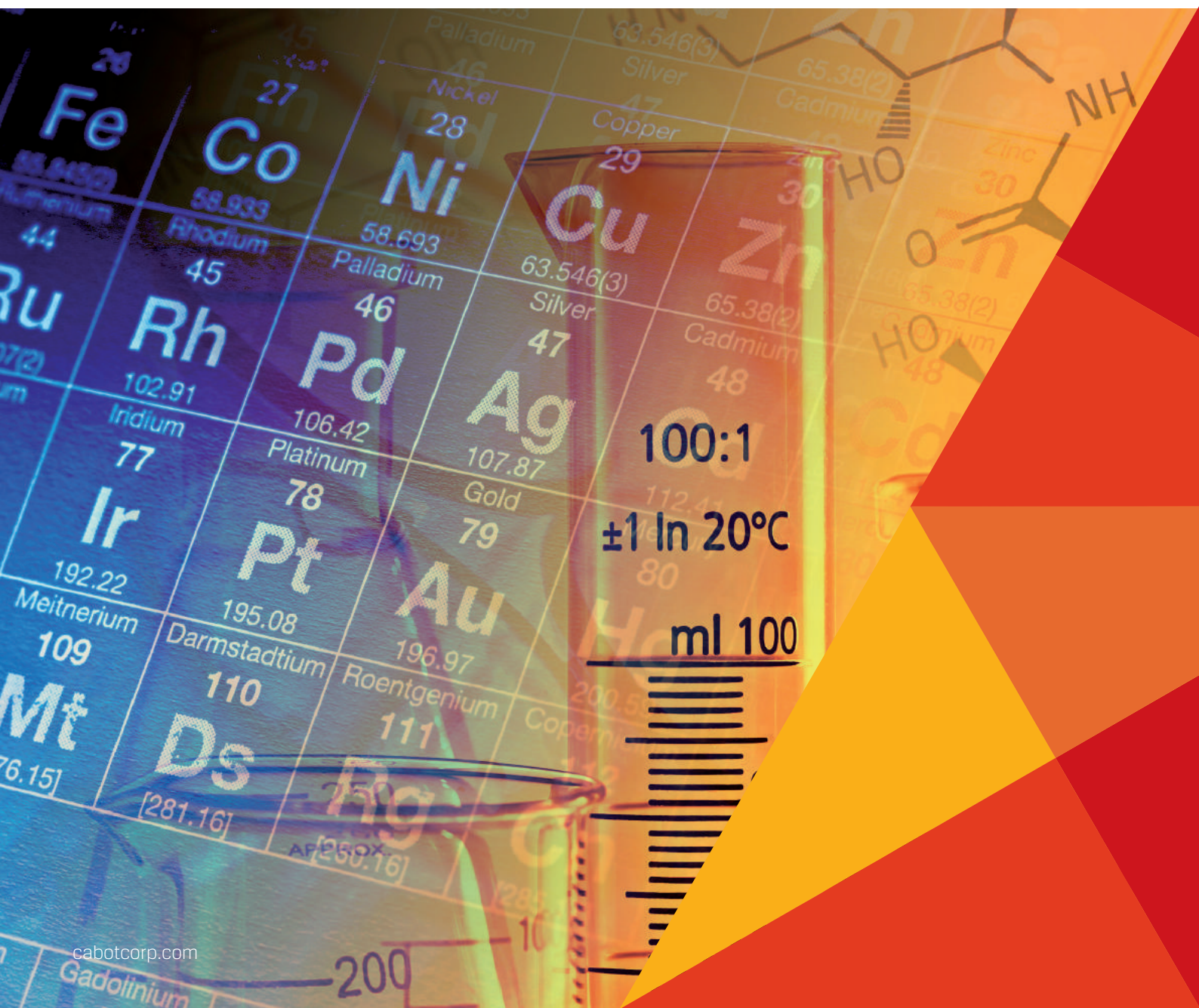




NORIT ACTIVATED CARBON

ACTIVATED CARBON FOR CATALYST SUPPORT



100:1
±1 ln 20°C
ml 100

CABOT NORIT ACTIVATED CARBON: LEADING PRODUCER OF CATALYST SUPPORTS

Most chemical processes require a catalyst, making them vital to the pharmaceutical and fine chemical industry. Activated carbon is a material that has all the required characteristics to be used as a catalyst support. When compared to other carriers, like silica or alumina, activated carbons provide:

- ◆ Greater internal surface area and lower cost per cubic meter
- ◆ Stable inertness in harsh process conditions such as acidic and alkaline solutions
- ◆ No interference with selectivity or activity
- ◆ Availability in powdered, granular and extruded shapes
- ◆ Easy recovery of precious metals

Our activated carbon catalyst carriers offer consistency, extremely high purity, low attrition and unique surface chemistry. These products are available in various pore size distributions, resulting in excellent catalyst dispersion over the carbon surface.

ACTIVATED CARBON AS CATALYST SUPPORT

Many of today's chemical processes require the use of a catalyst supported on a carrier. The greater internal surface area, high inertness and versatility make our activated carbons an ideal support in many applications including:

- ◆ Precious metal catalysts (e.g. Au, Pt, Pd, Ir, Ru, Rh, etc.)
- ◆ Base metal catalysts (e.g. Co, Cu, Zn, Fe)

Precious Metal Catalyst Support for Pharmaceutical and Fine Chemical Synthesis

Most pharmaceutical and fine chemical companies require catalysts for chemical synthesis. Our activated carbon products play a key role as carriers for precious metals in this application, offering strict product specifications, increasing the efficiency of the catalyst impregnation process and reducing valuable testing and process time.

Our activated carbon product portfolio for the precious metal catalyst carrier market

Type	Product	Activity/Porosity	Purity	Filterability	Hydrophilic	Acidic
PAC	NORIT® SX PLUS CAT				-	No
	NORIT SX PLUS F CAT				-	No
	NORIT SX 1G CAT				-	No
	NORIT GSX CAT				-	No
	NORIT CAP SUPER				Yes	Yes
	NORIT CNI				Yes	No
Type	Product	Activity/Porosity	Purity	Pressure drop	Hydrophilic	Acidic
EAC	NORIT RX 3 EXTRA				-	No
	NORIT RX 1.5 EXTRA				-	No
	NORIT ROX 0.8				-	No
	NORIT CATAPURE				Yes	No

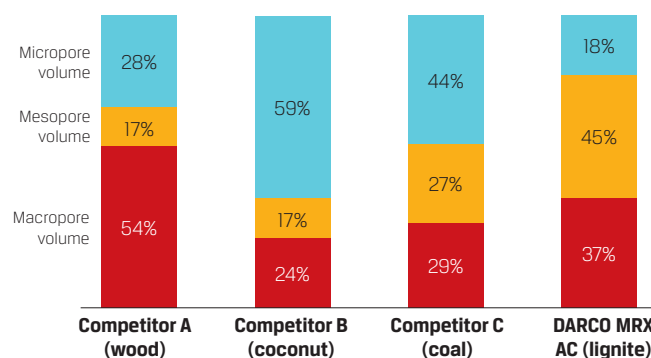
Typical Chemical Reaction Applications

- ◆ Hydrogenation
- ◆ Reductive akylation/amination
- ◆ Carbon-oxygen/nitrogen cleavage
- ◆ Hydrodehalogenation
- ◆ Decarbonylation
- ◆ Disproportionation
- ◆ Dehydrogenation
- ◆ Oxidation
- ◆ Dehydrohalogenation
- ◆ Debenzylation
- ◆ Hydroxylamine synthesis
- ◆ Electrocatalysis

Base Metal Catalyst Support for Hydrocarbon Sweetening

The hydrocarbon sweetening process involves the catalytic extraction of mercaptans from refinery products. We provide specially developed granular activated carbon (GAC) grades as catalyst carriers for hydrocarbon sweetening. Due to its large internal surface area, these carbons have proven to be excellent carriers for the catalyst, enabling efficient conversion of the mercaptans to disulfides.

Pore volume comparison of DARCO® MRX vs. competitive activated carbons



Higher mesopore and macropore volume of DARCO MRX activated carbon products suggests greater capacity to prevent catalyst fouling and quicker mercaptan conversion.

CHOOSING THE RIGHT ACTIVATED CARBON

Due to high performance requirements in complex technical processes, only the highest quality activated carbons are selected for catalyst applications. Our activated carbon products meet these requirements by providing the optimal purity, pore volume, form, hardness and surface functionality necessary, making them the ideal choice for catalyst applications.

Powdered Activated Carbon Performance Requirements

Kinetics and filterability

This is achieved by controlling particle size distribution. A broader particle size distribution gives better kinetics between reactants and the actual catalyst. A narrow particle size will give fast filtration but sacrificing suspension characteristics.

Optimal catalyst activities

Higher mesoporosity will give benefits in terms of available surface area for catalyst dispersion, faster transport of reactants in and out the pores and eventually adsorption of unwanted byproducts.

Minimizing side reactions

High purity of the activated carbon is required to prevent side reaction or poisoning of the catalyst.

Extruded Activated Carbon Performance Requirements

Minimizing metal loss

A high crushing strength is required to prevent collapse of the carbon bed, and high hardness, resulting in a low abrasion to avoid catalyst into fines so that it minimizes the loss of your precious metals.

Longer life and higher yield

Effectively overcoming the poisoning of the actual catalyst will extend the catalyst's life span.

Higher activity

This is achieved by the larger surface area of carbons with higher mesoporosity. In this situation the "egg shell" metal catalyst is mainly dispersed on the outside of the carbon particle.



AHEAD OF THE CURVE

Building on our 100-year history of innovation in manufacturing and product development, Cabot Norit Activated Carbon is the world's largest and most experienced producer of activated carbon serving customers in more than 100 countries around the world with manufacturing facilities in seven countries. Our products are used to remove pollutants, contaminants and other impurities from water, air, food and beverages, pharmaceutical products and other liquids and gases efficiently and cost-effectively. We have created more than 150 different grades of activated carbon – produced from a variety of raw materials – so our customers get precise solutions for their specific applications. Additionally, we offer a full range of activated carbon services including rental systems, carbon reactivation, bulk delivery and change-out, carbon evaluation and direct technical support to insure the right product solution every time.

Our sales, technical service and customer service teams are prepared to serve customers around the world. Contact us at cabotcorp.com/activatedcarboncontact



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