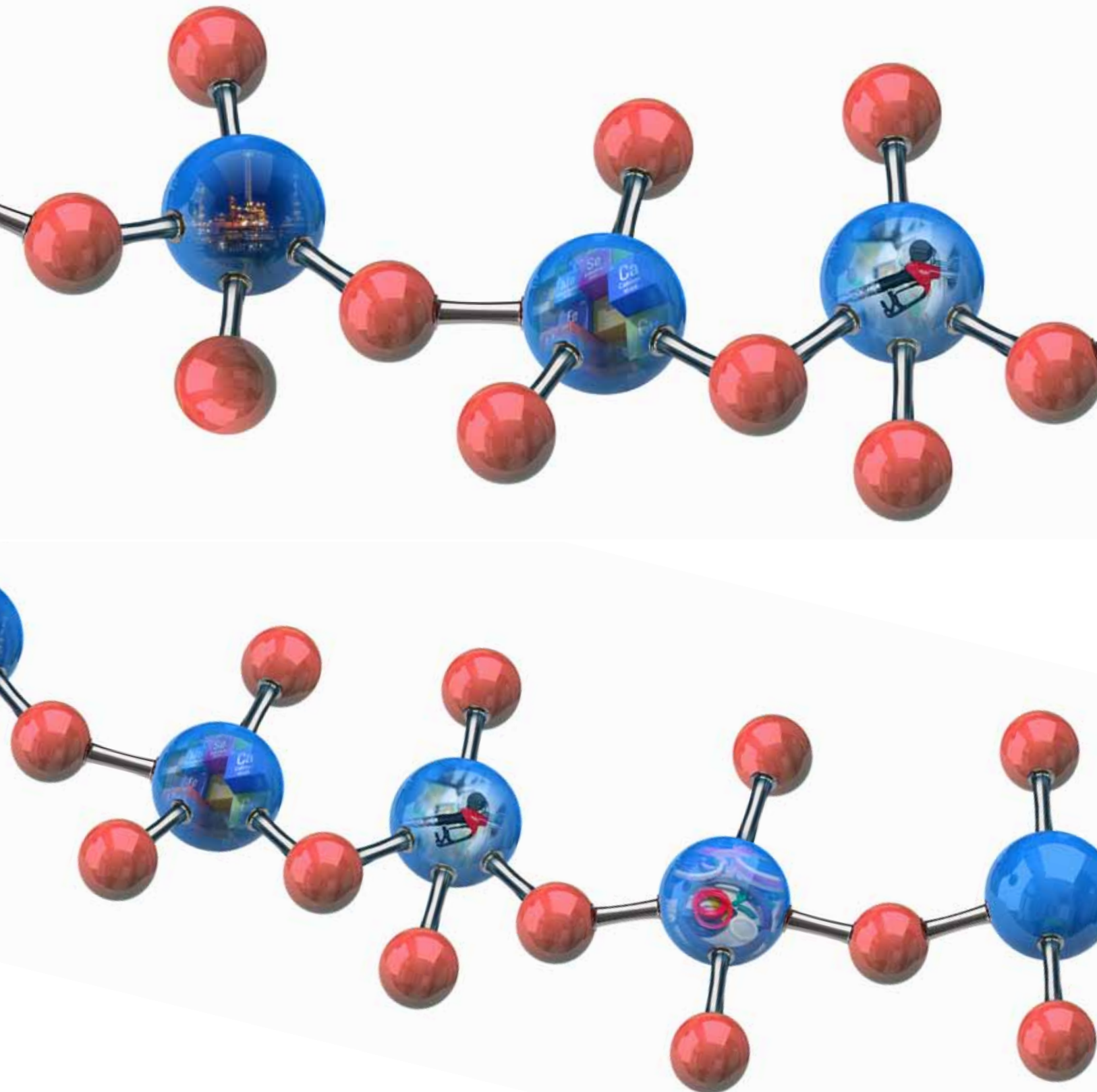


SILICA CATALYSTS

High Performance Synthesis Catalysts and Supports



High Performance Synthesis Catalysts & Supports

World class catalysts & supports designed to give exceptional performance for chemical manufacturing processes

- Chemicals
 - Elastomers
 - Polymers
 - Alternative Fuels
 - Environmental
-
- Fixed Bed
 - Fluidised Bed
 - Slurry Phase
-

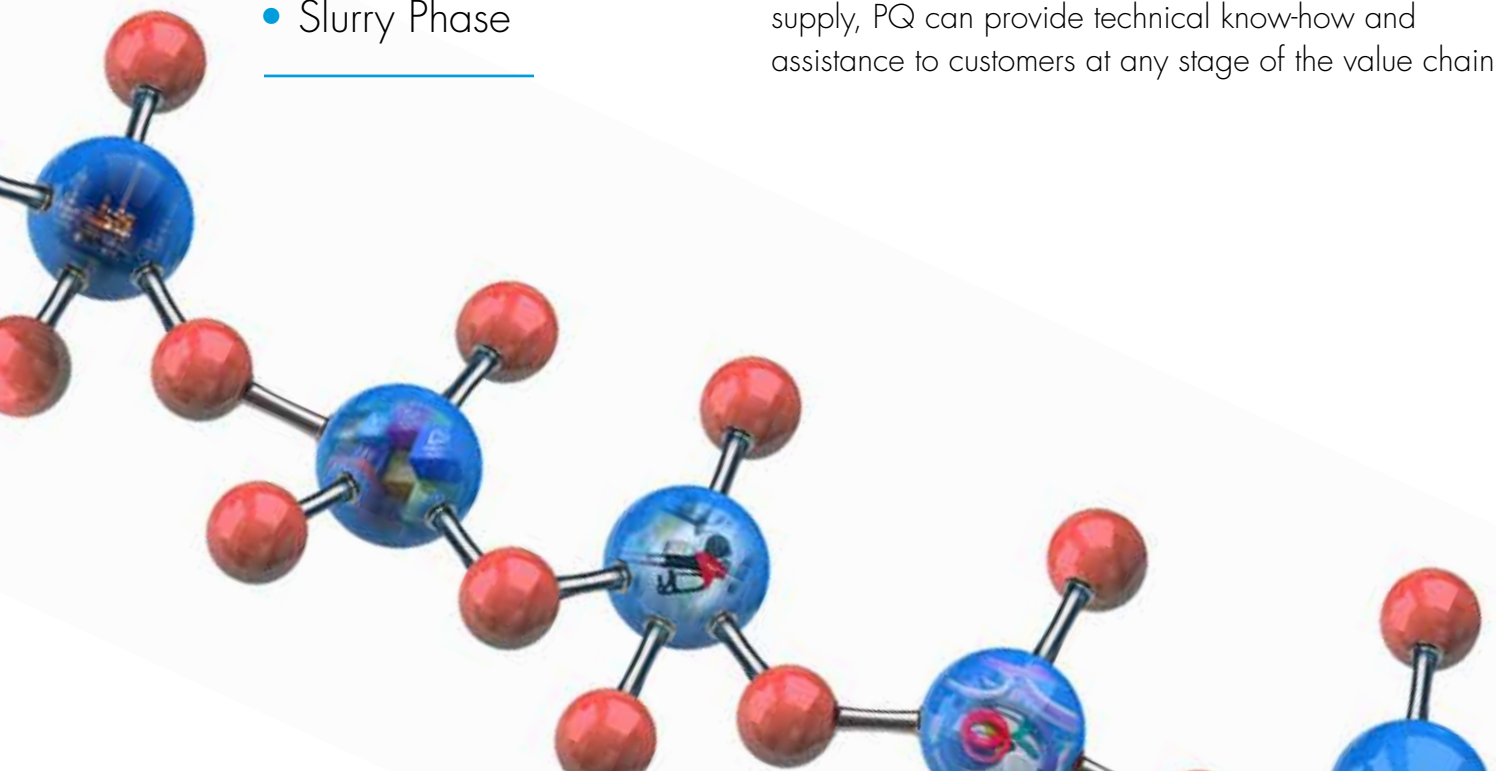
PQ silica based supports and catalysts are widely used in the manufacture of process intermediates & fine chemicals, elastomers & polymers, alternative energy, water treatment & environmental controls.

Today's highly competitive global marketplace requires companies to continuously innovate and rapidly develop improved products or processes. PQ works closely with customers to develop and manufacture customized supports and catalysts to meet these challenges.

Combining PQ's long history in the production of silica catalysts and supports with state-of-the-art manufacturing processes gives it the capability to tailor the properties of the supports and catalysts to meet specific performance demands.

PQ is also a key global supplier of polyolefin catalysts and supports widely used for the production of polyethylene and polypropylene.

Coupled with a range of laboratory & pilot assets, PQ has the technical expertise critical to the successful development and commercialization of customized chemical catalysts. From the creation of ideas and samples through to commercial manufacturing and supply, PQ can provide technical know-how and assistance to customers at any stage of the value chain.



THE BENEFITS OF PQ PRODUCTS

High Purity

As a result of the strict control of raw materials and advanced process technologies, PQ produces silica supports that have low levels of impurities. PQ is the world leader in the production of sodium silicate, a key raw material in the production of silica supports, so the quality of this critical feedstock is directly managed. High purity imparts silica supports with excellent thermal stability and well controlled acidity.

Uniform Products

Through the careful control of critical process steps, PQ produces products that are highly uniform at both a macroscopic level (batch to batch consistency) and a microscopic level (particle to particle uniformity).

Customizable Catalysts

Through proprietary process technologies and state-of-the-art manufacturing assets, PQ excels in its flexibility when tailoring physical & chemical properties;

Physical properties

- Surface Areas ranging from 100 – 1000 m²/g
- Pore Volumes ranging from 0.5 – 3 ml/g
- Particle sizes ranging from 1 μm to 5mm
- Granular, spherical and extruded silicas
- Particle strength

Chemical properties

- Composition
- Purity
- Acidity
- Metal distribution and dispersion
- Surface functionalization

The tailoring of chemical properties is achieved by technologies such as co-gelation, impregnation, ion-exchange, surface reaction and encapsulation.

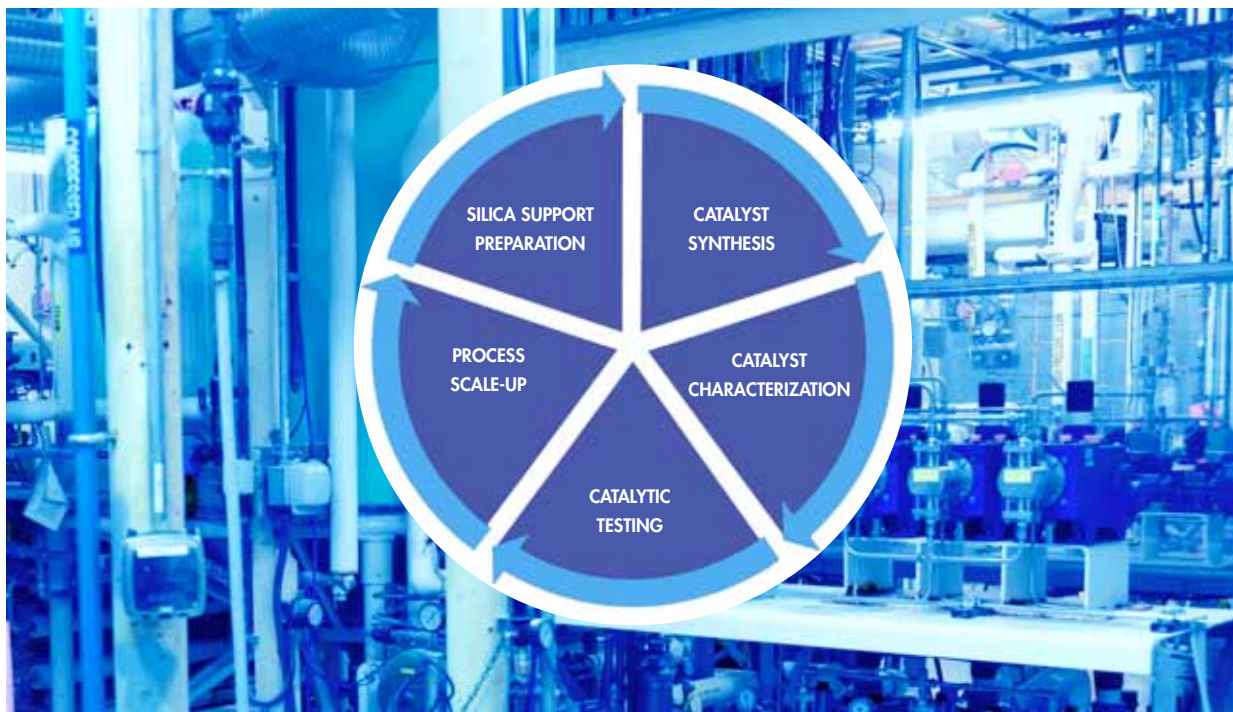
Access to Experts

Expert technical service is provided by an experienced team at R&D centres in the USA and Europe, who specialize in support, catalyst & process development. Being equipped with this diverse range of specialist knowledge and equipment allows for the rapid development of commercial products and processes from the simplest of ideas.



DELIVERING FLEXIBLE CATALYSTS AND SUPPORTS

Highly consistent products and unsurpassed technical support



Delivering Expert Technical Service

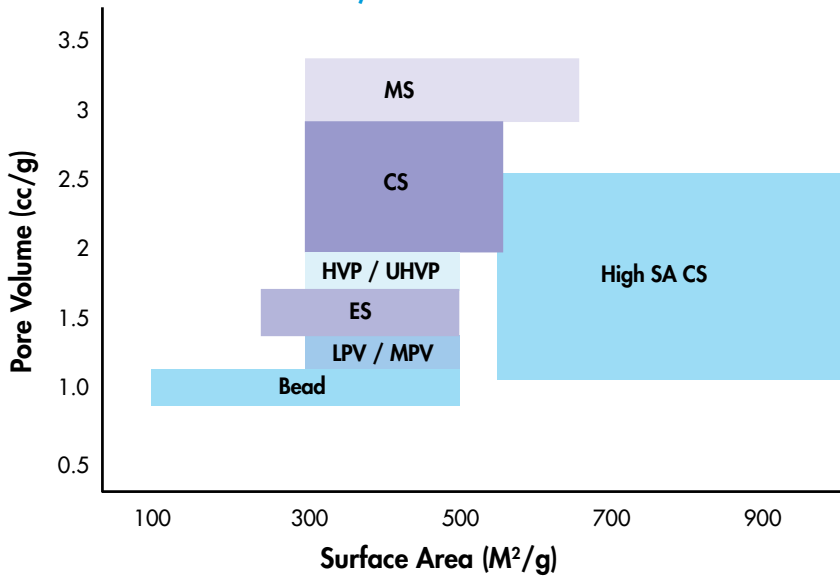
Well-equipped analytical laboratories provide excellent capabilities in characterizing silica catalysts and supports for physical and chemical properties. The range of analytical techniques available includes, but is not limited to, the following;

PROPERTIES	ANALYTICAL METHODS
Porosity	N2 and Hg porosimetry
Particle size & Shape	Laser diffraction, Dynamic image analysis, Dynamic light scattering, Optical microscopy, SEM
Particle strength	Individual particle strength, bulk crush strength, attrition
Composition	AA, ICP, XRF, EDS, IC, GC-MS, HPLC, titration
Thermal analysis	TGA, DSC
Crystallinity	XRD
Structural analysis	IR, UV-Vis, Raman, TPD, TPR

Lab and Pilot facilities are available for rapid scale up from grams to kilograms to tonnes and the range of available equipment includes mixing, washing, ion-exchange, filtration, extrusion, drying and calcination. Capability exists for both aqueous and organic processing.

For further information, contact us via email: techsupport@pqcorp.com

SURFACE AREA / PORE VOLUME



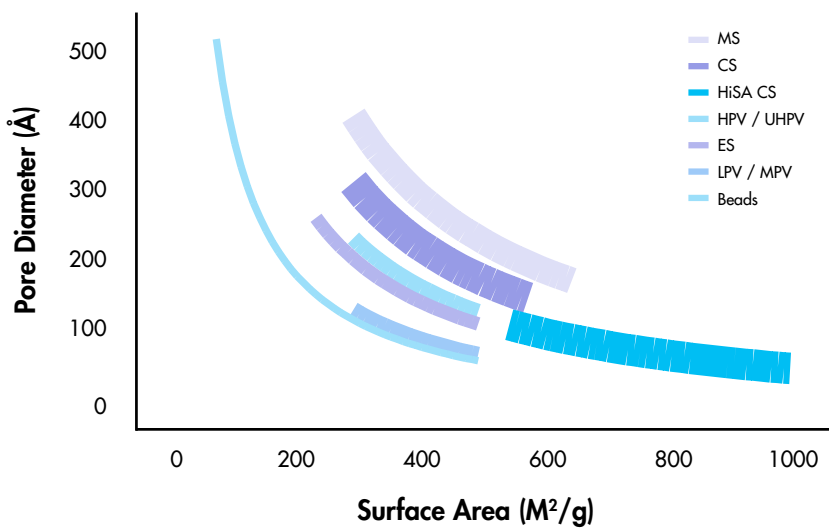
Extrudate Support



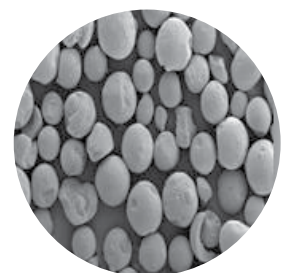
Bead Support

PQ's global manufacturing operations have both the experience and the technical expertise to develop and manufacture products that meet the specifications demanded whilst exhibiting very low statistical variance.

AVERAGE PORE DIAMETER

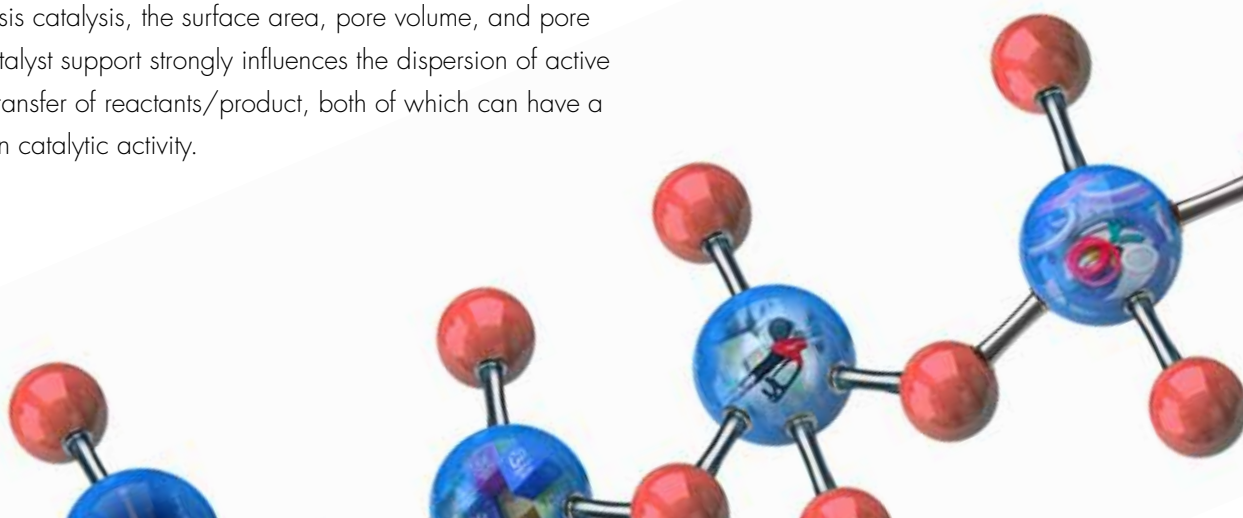


Granular Support



Microspherical Support

In chemical synthesis catalysis, the surface area, pore volume, and pore diameter of the catalyst support strongly influences the dispersion of active metals and mass transfer of reactants/product, both of which can have a significant effect on catalytic activity.

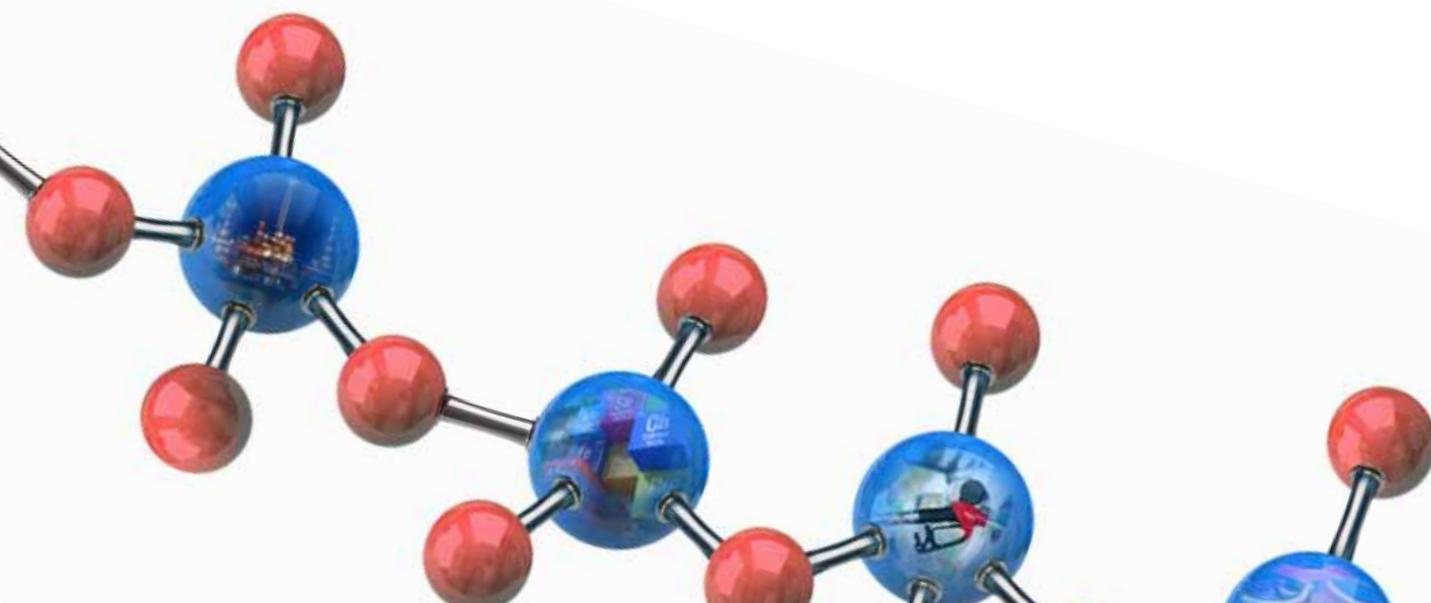


CATALYST PREPARATION - ELEMENTS

H Hydrogen																	He Helium
Li Lithium	Be Beryllium											B Boron	C Carbon	N Nitrogen	O Oxygen	F Fluorine	Ne Neon
Na Sodium	Mg Magnesium											Al Aluminium	Si Silicon	P Phosphorus	S Sulphur	Cl Chlorine	Ar Argon
K Potassium	Ca Calcium	Sc Scandium	Ti Titanium	V Vanadium	Cr Chromium	Mn Manganese	Fe Iron	Co Cobalt	Ni Nickel	Cu Copper	Zn Zinc	Ga Gallium	Ge Germanium	As Arsenic	Se Selenium	Br Bromine	Kr Krypton
Rb Rubidium	Sr Strontium	Y Yttrium	Zr Zirconium	Nb Niobium	Mo Molybdenum	Tc Technetium	Ru Ruthenium	Rh Rhodium	Pd Palladium	Ag Silver	Cd Cadmium	In Indium	Sn Tin	Sb Antimony	Te Tellurium	I Iodine	Xe Xenon
Cs Cesium	Ba Barium		Hf Hafnium	Ta Tantalum	W Tungsten	Re Rhenium	Os Osmium	Ir Iridium	Pt Platinum	Au Gold	Hg Mercury	Tl Thallium	Pb Lead	Bi Bismuth	Po Polonium	At Astatine	Rn Radon
Fr Francium	Ra Radium		Rf Rutherfordium	Db Dubnium	Sg Seaborgium	Bh Bohrium	Hs Hassium	Mt Meitnerium	Uun Ununillium	Uuu Ununium	Hg Ununbium		Uuq Ununquadium		Uuh Ununhexium		

 Metals utilised by PQ > lab quantities; those used at lab scale not shown

Due to the importance of the metal to silica interface in catalysis, silica supported metal catalysts are arguably the most significant class of catalyst systems used today. As industry demands continue to change, the portfolio of metal catalysts supplied by PQ adapts to meet those needs.

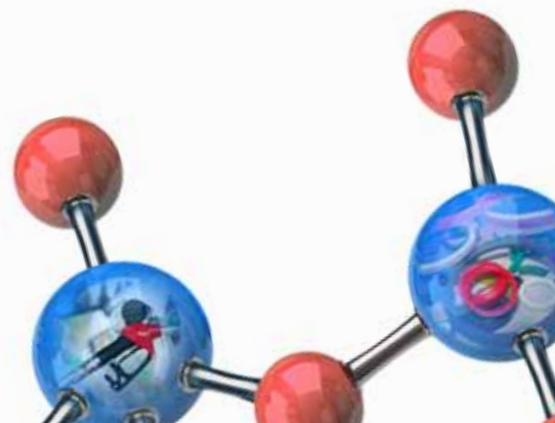


STORAGE & HANDLING

PQ catalysts and supports must be stored in a dry place and handled sensibly to minimise creation of dust and build-up of static electricity.

HEALTH & SAFETY

Material Safety Data Sheets providing detailed toxicological and handling information on all PQ silica products are available upon request.



Technical Service

PQ Corporation offers a high standard of technical and analytical service to ensure optimum performance of its products. For assistance, contact us via email: techsupport@pqcorp.com

RESEARCH & DEVELOPMENT CENTRES



PQ Corporation
280 Cedar Grove Road
Conshohocken
PA 19428
USA
T: +1 610 651 4600
F: +1 610 825 1421
techsupport@pqcorp.com



PQ Corporation
4 Liverpool Road
Warrington
WA5 1AB
United Kingdom
T: +44 1925 416100
F: +44 1925 416116
techsupport@pqcorp.com

MANUFACTURING PLANTS



PQ Corporation
4 Liverpool Road
Warrington
WA5 1AB
United Kingdom
T: +44 1925 416100
F: +44 1925 416116



PQ Corporation
1700 Kansas Avenue
Kansas City
KS 66105, USA
T: +1 913 371 3020
F: +1 913 371 0646

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