

# STREM High Surface Area Silica Nanoparticles

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Novel fibrous shaped silica nanospheres, denoted as KCC-1 (KAUST Catalysis Center)<sup>[1]</sup>, have unique physical properties which have never before been reported in silica materials. These nanomaterials have been developed by Prof. J. M. Basset of King Abdullah University of Science and Technology (KAUST). A fibrous surface morphology arranged in three-dimensional structure forms the spheres (Fig. 1). Unlike traditional pore-based silica, these nanospheres possess a fibrous structure that increases accessibility to the available surface area; this in turn, significantly increases the catalytic activity.

These materials exhibit excellent physical properties, including a high surface area, a fibrous surface morphology, good thermal and hydrothermal stabilities and high mechanical stability (Table 1). The fibrous morphology of KCC-1 remains unaffected even after mechanical compression up to 216 MPa pressure. This is superior to the conventional MCM-41 type of silica, which is affected at pressure 86 MPa.<sup>[1]</sup>

A range of heterogeneous catalysts, prepared using KCC-1 as a supporting material, have been showing excellent catalytic activity for various transformations of research and industrial importance. As a catalyst support, sorbent or carrier, KCC-1 is able to demonstrate superior activity as compared to regular mesoporous silica materials in energy related processes <sup>[2-3]</sup>, a variety of organic reactions <sup>[4-7]</sup>, biomedical applications and drug delivery systems <sup>[8]</sup>, optoelectronic devices <sup>[9]</sup> and many others.

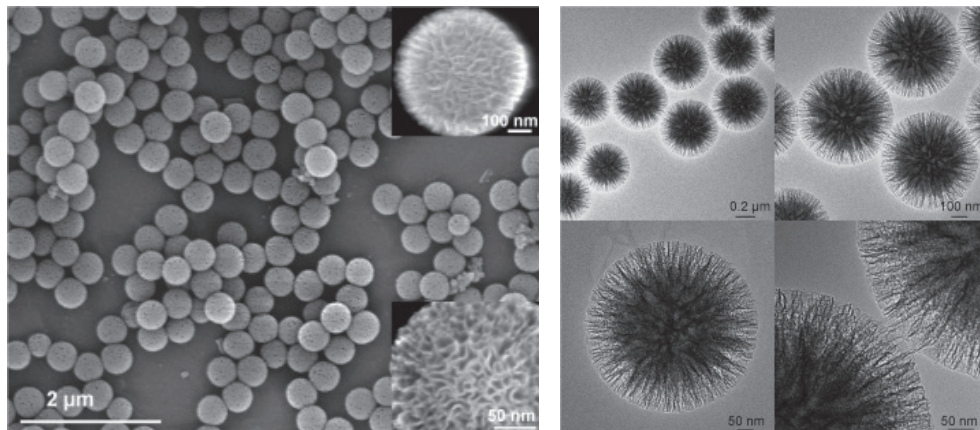


Figure 1: SEM and HRTEM images of silica nanospheres KCC-1

96-5050 High Surface Area Silica Nanoparticles Kit				Contains smallest unit size for each of the following			
Product#	Category	Grade	Particle Size (nm)	Surface Area (m <sup>2</sup> /g)	Pore Volume (cm <sup>3</sup> /g)	Color and Form	Available Unit Sizes
14-6100	Large	(KCC-1 L1)	~900-1000	~700	~1.4	white powdr.	1g, 5g
14-6110	Large	(KCC-1 L2)	~900-1000	~600	~1.2	white powdr.	1g, 5g
14-6120	Large	(KCC-1 L3)	~900-1000	~550	~0.9	white powdr.	1g, 5g
14-6200	Medium	(KCC-1 M1)	~400-450	~400	~0.7	white powdr.	1g, 5g
14-6210	Medium	(KCC-1 M2)	~300-350	~600	~0.6	white powdr.	1g, 5g
14-6300	Small	(KCC-1 S1)	~130-190	~380	~0.8	white to beige powdr.	1g, 5g
14-6310	Small	(KCC-1 S2)	~40-50 nm	~520	~1.3	white to beige powdr.	250mg, 1g, 5g

Components also available for individual sale

References:

1. *Angew. Chem. Int. Ed.* **2010**, *49*, 9652
2. *Chem. Mater.* **2015**, *27*, 8237
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5. *Green Chem.*, **2016**, *18*, 5890
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7. *RSC Adv.*, **2017**, *7*, 24885
8. *Langmuir* **2014**, *30*, 10886
9. *J. Mater. Chem. B*, **2015**, *3*, 3201

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