



The CHEMunicator

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Focus on Rochester Section Technology - Innovation Through Chemistry

Company: RocCera

Product / Technology: **Advanced structural ceramics technology**
Fabrication of precision high strength ceramic parts
by a proprietary netforming process

Web Site: www.roccera.com

Address: **Rochester Technology Park**
771 Elmgrove Road
Rochester, NY 14624

President & Company Founder: **Dr. Samel Ghosh**

Company Technical Areas: **advanced structural ceramics, material science,**
ceramics engineering,

Founded: **2006**

Number of Employees:

If the movie *The Graduate* were remade today, the career advice offered to Benjamin would probably be “ceramics” rather than “plastics”. Ceramics has been an established technology area for centuries with many “low tech” ubiquitous products (pottery, dinnerware, sinks, etc.).

Indeed Western New York has two of the major centers for this industry, Corning (the inventor of the Cordierite () ceramic substrate for catalytic converters for the transportation industry), and Alfred University (the first established academic center for ceramic science in the U.S. – established in 19..) This field has, however, exploded over the past two decades, encompassing a vast array of materials for applications in electronics to structural materials with extremely high strength, corrosion resistance, and mechanical properties. A significant landmark in this technology was the discovery of the so-called “123” high temperature superconductor in 19.... This material a ceramic with the composition....., was show to exhibit a critical temperature (Tc) of °C, an increase of some ... °C above that of the then benchmark material (Tc = °C ; a value which had plateaued for some ... years before the discovery of this new material). This discovery that a readily prepared ceramic material could exhibit such a high transition temperature, and offering the possibility of a room temperature high Tc superconductor by optimization of related ceramics, created a flurry of basic and applied research throughout the world. A “low tech” area suddenly evolved into a promising research area, not just for traditionally trained ceramists but also for chemists and material scientists to develop new ceramics and fabrication processes for both thin films and **monoliths**, for applications in both electronics and improved structural materials. **Table 1** summarizes the types of materials that are included in the general field of “ceramics”

Table 1 – Types of Ceramics

Definition: a ceramic is

Type	Example	Properties / Application	Ref.
Structural Ceramics			
Traditional			
Structural	YSZ		
Advanced Structural Ceramics	TZP		
Refractory	tungsten carbide (WC)	hard / wear resistant coatings (e.g., drill bits)	
	SiC	high temperature stability	

	Cordierite	diesel particulate filters substrates for catalytic converters (three-way automotive catalytic converter)	
Electronic Ceramics			
Electrooptic Cersamics	lead zirconium titaanate beta barium borate		
Semiconductors	diamond films		
High Tc Superconductors	(123 material)		

Sam Gosh, who founded Roccera in 2006, has an impressive background in both the basic material science as well as the manufacture and industrial applications of electronic as well as structural ceramics. Sam did his undergraduate work in his native India, receiving a B.,S. in from the University of....

He then moved to the Univ. of where he received his Ph.D. in in 19 , working in the laboratory of ... His thesis work involved.....

In 19 he joined the Kodak Research Laboratories where his initial worked involved.....

1981 – silicon carbide (SiC) first used a nubbin (mold) material for manufacture of high precision glass lens.

This technology was later applied to replace steel bearings in chemical delivery pumps used in the manufacture of acetate film base, resulting in a 10-20X longer lifetime for these parts compared to the steel bearings.

In 1993, with the formation of the Corporate Research Laboratories for exploring and commercializing new materials-based technology, a Ceramic Science Laboratory was formed within this organization to develop new ceramic materials and fabrication process for both electronic and structural applications. Sam’s success, broad impact and impressive innovations

in this broad field is evidenced by the 150 U.S. patents he has received for his work in ceramic materials and their fabrication processes. His pioneering work in advanced structural ceramics at Kodak is especially noteworthy. This work led to new ceramic materials and fabrication processes that provided parts for manufacturing lines/equipment that gave significantly improved durability, corrosion resistance and useful lifetimes compared to conventional steel parts. This work resulted in large cost savings in the manufacturing environment by reducing the cost of machine parts (i.e., expensive precision machined metal parts were replaced by net-formed ceramic parts), as well as by significantly reducing down time for replacing worn-out metal parts.

In subsequent work he developed new advanced structural ceramics with even higher strength, and chemical and wear resistance properties which were used in manufacturing processes.

In 2006, Sam retired from Kodak and, with the help of his former employer who wanted to maintain a supply of ceramic parts for their manufacturing operations, formed RocCera.

History of RocCera

Pictures of equipment / ovens / extruders, etc.

Pictures of products (label / applications)

Ceramic Data Figures/Tables (XRD, TEM, etc.)

The company WEB site (www.rocerra.com) has a wealth of information on its technical capabilities, products, properties of structural ceramics, and netforming technology. Roccera will also be the featured company at the Section's July 7 Networking Mixer at MacGregors (300 Jefferson Road, Henrietta – 5-8 p.m. - see the Section website, www.RochesterACS.org, for details)