

ZR-RIG

Yttria Stabilized Zirconia Rigidizer

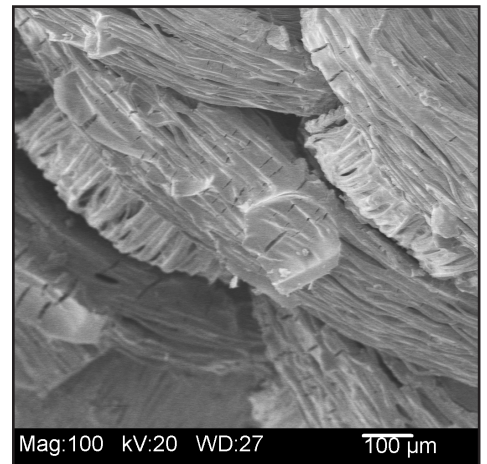
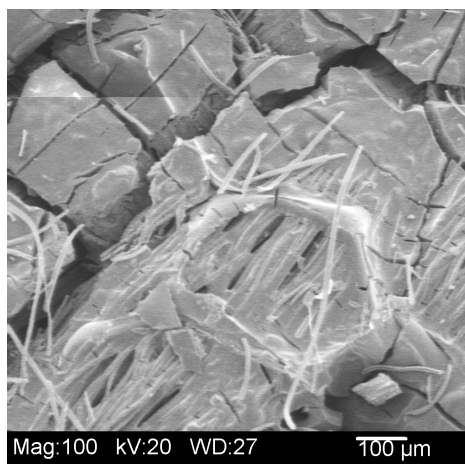
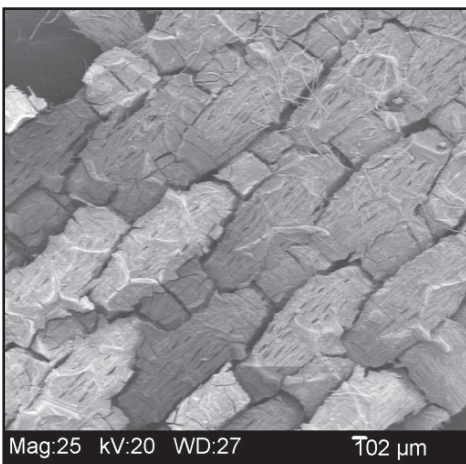
Zircar Zirconium Oxide Rigidizer, ZR-RIG, is formulated for the surface hardening of all zirconia fiber products and for use in the fabrication of zirconia composites from **Zircar** textiles and other advanced materials. Such composites are comprised of a matrix of zirconia fibers reinforced with sub-micron zirconia particles. ZR-RIG has the same calcined composition as our ZYBF zirconia fibers and forms a fully stabilized zirconia body upon curing.

ZR-RIG contains sub-micron particles of yttria stabilized zirconia suspended in a zirconium acetate aqueous solution. The suspension will settle in transport as shown in the pint sized container in the picture. The water based rigidizer, when mixed, has the consistency of a low viscosity house paint. Should the rigidizer become too thick during use for complete penetration into the surface of the zirconia fiber product, it can be thinned by small additions of de-ionized or distilled water.



Product Micrographs

Shown below are micrographs of satin weave zirconia cloth, ZYW-30A, rigidized three successive times with zirconia rigidizer, ZR-RIG, and high fired. The resulting composite body still shows the original satin weave structure of the zirconia cloth. The raised ridges which approximate a honeycomb pattern are from contact with open cell urethane foam which was used as the contact surface in a fixture to restrain the rigidized cloth in a flat sheet during drying.



Directions For Use

Bonding Layers of Zirconia Cloth into a Composite

1. Thoroughly mix ZR-RIG before using. It is normal for the sub-micron yttria-stabilized zirconia particles to settle during storage. Using a sponge, brush, spray or simply by pouring on, saturate both sides of the cloth using a liberal amount of ZR-RIG to assure uniform penetration. The rate of application of ZR-RIG for use with **Zircar** cloth ZYW-30A in the production of zirconia composites is about 2.5 fluid ounces per square foot of cloth.
2. Remove excess ZR-RIG from the textile with a rubber squeegee or roller. Partially dry the saturated textile with a stream of dry air or in an oven at low temperature until the ZR-RIG becomes tacky (essentially a "B-staging" operation). A heat gun has been successfully used when the textile is turned several times during heating.
3. Laminate the pieces together or form to shape while the ZR-RIG is tacky. Roll or press the layers together to make good contact.
4. Dry the body slowly, starting at 100-200 °F for several hours, increasing the temperature to 240-300 °F over a period of 3-4 hours. The maximum rate of drying depends on the thickness of the lay-up. Two layers can normally be dried in 1-2 hours at 240 °F. 10 layers or more require 24 hours at 300 °F to dry thoroughly.
5. Cure the rigidizer by heating at 800-1000 °F for 1 hour. Ramping up to these temperatures over a period of several hours is recommended. In some applications, it may be desirable to cure the body above 2000 °F for increased strength.

Surface Hardening Zirconia Fiber Products

1. Thoroughly mix ZR-RIG before using. Using a sponge, brush, or by dipping, apply several light coats of ZR-RIG to the fiber surface. The rigidizer should soak into the fiber surface completely. When it cures up on the surface the pores are full.
2. Allow the treated parts to air dry overnight. Curing at 800-1000 °F is then recommended.

To Place an Order

Call: 845-651-3040

email: sales@zircarzirconia.com

store: www.zircarzirconia.com/store

ZR-RIG

Size	Item Number
1 Pint	BB001
1 Quart	BB002

Properties & Characteristics

Properties (Nominal)	ZR-RIG
Melting Point, °C (°F) ⁽¹⁾	2590 (4694)
Specific Gravity	1.87
Solids Content, Wt%	50
Cured Chemical Composition (Nominal)	
Oxide	Wt%
ZrO ₂ ⁽²⁾	90
Y ₂ O ₃	10
Trace Inorganics	<0.3

⁽¹⁾ Maximum use temperature is dependent on variables such as the chemical environment and stresses; both thermal and mechanical.

⁽²⁾ 1-2% weight hafnia (HfO₂) occurs naturally with zirconia (ZrO₂) and does not affect performance.



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