



Single Crystal Fibers of Yttria-Stabilized Cubic Zirconia with Ternary Oxide Additions

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By F. J. Ritzert

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 38 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. Single crystal fibers of yttria (Y₂O₃)-stabilized cubic zirconia, (ZrO₂) with ternary oxide additions were grown using the laser float zone fiber processing technique. Ternary additions to the ZrO₂-Y₂O₃ binary system were studied aimed at increasing strength while maintaining the high coefficient of thermal expansion of the binary system. Statistical methods aided in identifying the most promising ternary oxide candidate (Ta₂O₅, Sc₂O₃, and HfO₂) and optimum composition. The yttria, range investigated was 14 to 24 mol and the ternary oxide component ranged from 1 to 5 mol. Hafnium oxide was the most promising ternary oxide component based on 816 C tensile strength results and ease of fabrication. The optimum composition for development was 81 ZrO₂-14 Y₂O₃-5 HfO₂ based upon the same elevated temperature strength tests. Preliminary results indicate process improvements could improve the fiber performance. We also investigated the effect of crystal orientation on strength. This item ships from La Vergne, TN. Paperback.



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