

## MICROWAVE DRILLING OF CERAMICS

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The microwave-drilling technique using an open-end coaxial applicator was disclosed recently [1-3]. This paper presents new experimental and theoretical results of microwave-drilling studies in various ceramics, including mullite, alumina, and zirconia. The paper reviews the microwave-drill principles and describes the experimental setup and procedures. Aspects of igniting the microwave-drilling process in low-loss materials, and the dynamic impedance-matching adaptation are elaborated. The microwave-drill selectivity feature, found useful for ceramics coatings [4], is presented. The experimental results are analyzed and explained by a numerical simulation. The advantages and limitations of the microwave-drilling technique for ceramics are discussed.

## REFERENCES

1. E. Jerby, V. Dikhtyar, O. Aktushev, and U. Groszlick, "The Microwave Drill," *Science Magazine*, Vol. 298, pp. 587-589, Oct. 18, 2002.
2. For more publications, see [www.microwave-drill.com](http://www.microwave-drill.com)
3. E. Jerby, V. Dikhtyar, O. Aktushev, "Microwave drill for ceramics," *Amer. Ceram. Soc. Bulletin*, Vol. 82, No. 1, pp. 35-37, 2003.
4. E. Jerby and A.M. Thompson, "Microwave drilling of ceramic thermal-barrier coatings," J. Am. Ceram. Soc., Vol. 87, No. 2, pp. 308-310, 2004.

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