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Microwave Heating and Pre-sintering of Copper Powder Metal Compacts in Separated Electric and Magnetic Fields[1] KELLY MARTIN[2], EARNIE JOHNSON, JUNKUN MA, NICHOLAS MISKOVSKY, GARY WEISEL, BROCK WEISS, DARIN ZIMMERMAN[3], The Pennsylvania State University, Altoona College — We present results of microwave heating and pre-sintering of pure copper metal powder compacts. Using a 2.45GHz, WR284 microwave system operating in TE102 single mode resonance, we have systematically studied the microwave heating and pre-sintering behavior of various copper powder metal compacts as a function of particle size and green density. Cylindrical samples (0.25in by 0.25in) were positioned in either the magnetic– or electric–field antinode, allowing the study of the separate effects of the two fields. The results show significant differences in heating rates and sample microstructure (SEM) even when average sample temperatures are below half the melting point of bulk copper. Numerical simulations of the absorption and heating have been developed to check the consistency of the experimental results. We acknowledge the additional work of undergraduate students John Diehl, John Rea, Charles Smith, and Devin Spratt, who assisted in the setup of experimental apparatus, sample preparation, and data acquisition.

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[2]Lead undergraduate researcher
[3]Principal investigator

Darin Zimmerman
The Pennsylvania State University, Altoona College

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