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Effects of high density electric currents on material processing JAVIER GARAY, University of California, Riverside, ZUHAIR MUNIR, University of California, Davis — High density electric currents are common in integrated circuits and have recently been utilized as a parameter in material processing. discussion of the versatile material processing/synthesis techniques of spark plasma sintering and field activated pressure assisted synthesis. A variety of materials produced by these techniques including metals, nano-composites and intermetallics as well as possible applications of these materials as structural and functional materials are presented. The effectiveness of the electric currents are demonstrated by increased processing efficiency as well as manifested in the enhanced electrical and mechanical properties of the materials produced. In addition results from experiments performed with the aim of elucidating the current enhancing mechanism are introduced. These results show current enhanced reactivity and mass transport kinetics and help interpret the processing/synthesis findings.

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