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FUNCTIONALLY GRADED MATERIAL PREPARED BY
MICROWAVE INDUCED COMBUSTION SYNTHESIS

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Functionally Graded Materials (**FGM's**) are an attractive interlayer element for joining **ceramics** to metals for high temperature applications. In this study, microwaves were used to induce self-propagating high temperature synthesis (**SHS**) in the reaction $Ti+C+xNi \rightarrow TiC+xNi$. The SHS process was studied for cylindrical disks consisting of layers with $x = 0, 2, 4$ and 8 , using a TE102 microwave cavity mode. Three different approaches were investigated to ignite the samples: (a) microwave ignition, (b) microwave induced plasma ignition and (c) microwave induced plasma heating followed by microwave ignition. Samples could not be ignited using only the microwave ignition process, however combustion synthesis was possible using a microwave induced plasma. SEM photomicrographs of the Functionally Graded Materials produced by the microwave induced combustion synthesis process will be presented. [Work partially supported by NASA]