Abstract

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Novel glass-ceramic coating formation on metallic and ceramic substrates by microwave processing

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Abstract

Statement of the Problem: Ceramics possess high-temperature strength, high hardness, superior wear resistance, chemical stability, lower thermal and electrical conductivity. Glass-ceramics are prepared by controlled nucleation and crystallization of a glass precursor. The properties of glass-ceramics depend on its composition and microstructure, which are influenced by the processing technique. It has been already established that the microwave energy can be used for the processing of various materials on account of its unique microstructure and properties, improved product yield, energy savings, reduction in manufacturing cost and synthesis of new materials. The purpose of the present study was to form improved glass-ceramic coatings on metallic and ceramic substrates by using microwave processing technique.

Methodology: In the present study, conventional and microwave processing techniques were utilized to form glass-ceramic coatings on metallic substrates as well as ceramic substrates and subsequently characterized to examine the effect of processing technique on the coating properties.

Findings: It was observed that microwave processed glass-ceramic coatings had enhanced coating properties in comparison to those of the conventionally processed glass-ceramic coatings.

Conclusions & Significance:The microwave heating method can be utilized for the processing of glass-ceramic coatings with enhanced properties for both engineering and biomedical applications.

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Biography

Dr. Sumana Ghosh has completed B.E. from IIEST, Shibpur and M.Tech. from IIT, Kharagpur. She has got Ph.D. degree from Jadavpur University, Kolkata. Currently, she is the Principal Scientist of CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI), a premier research organization in India. She is working in the field of coating, joining and microwave processing of materials. She has published 45 papers in reputed journals. She has published 60 papers in national and international conference proceedings/ book of abstracts. She has 5 Indian patents and 9 book chapters. She is a reviewer of some SCI journals.

