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OBTENTION OF A CARBON-CARBON COMPOSITE MATERIAL FOR ITS USE IN EXPANDING
NOZZLES FOR AEROSPACE VEHICLES.

Abstract

General Introduction As part of the Project CONACYT-AEM 275425, a carbon matrix composite material was developed for its use in a propulsion system for orbital and suborbital launchers in the construction of an expanding nozzle which is required to increase the thrust of the ships engine and increase the gases discharge temperature to generate a bigger thermal expansion, forcing it to use materials with a service temperature of over 18000 C.

To obtain these materials it is common to use phenolic resin composites with carbon fiber put under a pyrolysis process to turn the C-H bonds into C-C bonds. These resins are hard to process under complex geometries due to the partition of the dust, which generates a fragile piece before the conversion. In this paper, the use of novolac epoxy resins is proposed as an anhydride curing agent and as a reinforcement of the carbon fiber. The viability of the use of these resins was determined through thermal analysis and determine the viability of the resins used to obtain C-C compounds.

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Characterization techniques used during the obtention process of the Carbon-Carbon composite material. Spectroscopy is a group of procedures that uses the interaction of photons with matter in order to characterize it. Out of this group of techniques, the one relevant for us is the vibrational spectroscopy. More specifically, infrared (FT-IR), Raman and spectroscopy