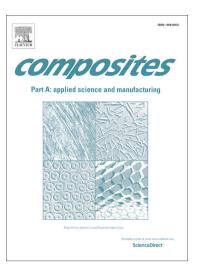
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Heat-resistant sandwich structure with carbon fiber-polyimide composite faces and a carbon foam core

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Title

Heat-resistant sandwich structure with carbon fiber-polyimide composite faces and a carbon foam core

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Abstract

This paper presents the processing and properties of a new heat-resistant sandwich structure, which consist of carbon fiber-polyimide composite face sheets and a carbon foam core. A novel phenylethynyl-terminated imide oligomer (TriA-X) was applied for both matrix resin and film adhesive. Mechanical properties of the sandwich structures were evaluated using flat-wise tension tests, and three-point bending tests. Bending strength of the sandwich panel was almost constant up to 250 °C. The bending rigidity of the sandwich panels showed good agreement with the numerical result by considering the temperature-dependent elastic modulus of CFRP and carbon foam. Thermal insulating properties of the sandwich structures were evaluated using infrared lamp heating tests in a vacuum chamber, resulting in good thermal insulating property. Heat transfer analysis of the sandwich structures was conducted using finite element method. Comparison with heating test results, the validity of the heat transfer analysis model was successfully demonstrated.

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