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Aromatic Thermosetting Copolyester Foam Core and Aluminum Foam Face Three-Layer Sandwich Composite for Impact Energy Absorption

Mete Bakir^a, Ersin Bahceci^b, Jacob L. Meyer^{a,d}, James Economy^{c,d}, Iwona Jasiuk^{a,*}

- a) Department of Mechanical Science and Engineering, the University of Illinois at Urbana-Champaign, 61801, Urbana, IL, USA.
- b) Department of Metallurgy and Materials Engineering, Faculty of Technology, Iskenderun Technical University, 31200, Iskenderun, Hatay, Turkey
- c) Department of Materials Science and Engineering, the University of Illinois at Urbana-Champaign, 61801, Urbana, IL, USA.
- d) ATSP Innovations, 61820, Champaign, IL, USA.

* Correspondence to Iwona Jasiuk. Email: ijasiuk@illinois.edu

Telephone Number: +1-217-333-92-59

ABSTRACT

In this work, we introduce a three-layer sandwich composite structure having an aromatic thermosetting copolyester (ATSP) foam core with two aluminum foam face layers joined together by an *in-situ* generated foaming mechanism. The ATSP foam core was synthesized on-site between the aluminum foam layers via a heat-induced polycondensation reaction. Upon curing, the ATSP foam core adhered to the aluminum foam layers through an interfacial compatibility-enabled chemical bonding. Lap shear experiments demonstrated that the bond strength clearly surpassed the tensile performance of the bare aluminum foam parts. Drop-weight impact tests showed that the three-layer sandwich structure could absorb four times the impact energy as compared to the bare aluminum foam of the same overall thickness.

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