# Production, Testing, Modeling, Characterization, and Application of Composite Material from Melting Unsorted Plastic Waste

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| **Abstract** | This paper presents a comprehensive work involving testing, modeling and application of composite material produced from a vertical induction furnace using unsorted plastic waste as raw material. The work is novel because studies based on such a unique combination, i.e., between the raw material and the melting equipment, are not available in the literature. Here, the solid phase of the composite material from the furnace was targeted for tensile testing, where uncertain strain-stress relationships were found, mainly indicated by different tensile strengths between 3.5 and 6.69 MPa. In response to such uncertainty, a material model is proposed here by using a statistical approach to capture random microstructures of such a composite material. Meanwhile, to support the tensile tests, material characterizations were carried out using SEM, EDX and Raman spectroscopy, which not only revealed the presence of particle impurities but also provided information on chemical elemental compositions. Finally, a promising application of such a composite material in a house building project is presented. |
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