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Title:Terahertz spectroscopy approach of the fiber orientation influence on CFRP composite solid laminates
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Abstract:Terahertz ray (T-ray) imaging applications have provided one of the most promising new powerful nondestructive evaluation techniques, and new application systems are under process development for area applications. Detecting flaws and defects in fiber reinforced plastic (FRP) composite laminates due to flaws in FRP composite laminate that affect laminate properties, including stiffness, strength, and thermal behavior, is very important. In this study, a new time-domain spectroscopy system was utilized for detecting and evaluating the flaws in FRP solid composite laminates. Extensive experimental measurements in reflection mode were made to map out T-ray images. In particular, electromagnetic properties, such as refractive index, were estimated in this characterization procedure. The estimates of properties were in good agreement with known data. Using these characteristic material properties, we successfully demonstrated the characteristics of the T-ray behavior propagating through FRP composites. Furthermore, layup effect and flaws of FRP composite laminates were observed in reflection mode, and limitations were discussed in the T-ray processing. © 2012 The Korean Society of Mechanical Engineers and Springer-Verlag Berlin Heidelberg.
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