

Fabrication and evaluation of density distribution in green bilayer iron powder compact

ABSTRACT

The study of densification on the porous surface of cross-section bilayer Iron powder compact was covered in this work. Both manipulated layers consisted of similar mechanical properties of powder with a mass of 10 grams applied and compacted under three different force magnitudes in a lubricated die condition. Three samples of bilayer were prepared according to the different load applied on the upper layer, 95 kN, 75 kN, and 55 kN. A load of 30 kN was then applied to the lower layer of iron for all labeled samples. Resulted thickness of a 10 mm bilayer sample was obtained after employing a one-sided double compression technique within rigid die. The consequence of navigation on its cross-section, which included the top, middle, and bottom regions was performed manually using an optical microscope. The results revealed that the first layer (or bottom layer), which was compacted by applying a minimum of 30 kN and the second layer (or upper layer), which was compacted by three different specified loads, possessed a lower percentage in porosities. However, the highest load of 95 kN on the second layer displayed homogeneous densification around the interface, that is, 0.95 in which is near to full relative density.

Keyword: Layered; Green; Iron powder; Compaction; Bilayer; Relative density; Quantitative analysis; Grid; Magnification; MATLAB