

Mendapatkan young's modulus fasa Cu₆Sn₅ dengan teknik ultrasonik dan teori komposit

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Abstrak

The purpose of this study is to obtain the Young's Modulus (elastic property) of Cu₆Sn₅ phase by using ultrasonic technique and composite theory. Alloy with the following composition (weight percent = wt%): 15.00% Cu and 85.00% Sn was fabricated by casting method. Phases identification were determined by using X-ray Diffraction (XRD), Differential Scanning Calorimeter (DSC), and Scanning Electron Microscope (SEM) + EDAX (Energy Dispersive X-ray Analysis). A non destructive technique is preferable evaluation method for evaluation the elastic property of material, that is by utilizing longitudinal and transversal waves velocity employed by ultrasonic pulse-echo method. X-ray diffraction, DSC, and SEM+EDAX analysis indicate that the fabricated Cu-85% Sn alloy produce a composite in situ material which consist of Sn as a matrix (0.67 volume fraction) and Cu₆Sn₅ phase as a reinforcing material (0.33 volume fraction). The Young's Modulus value of Cu-85% Sn is 67.7 GPa. This value is base on the calculating result on the longitudinal and transversal waves velocity. In order to obtain the Young's Modulus of reinforcement (Cu₆Sn₅ phase) the composite theory was applied to this material (Cu-85% Sn), and the resulted value is 103.8 GPa.