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.