



CHARACTERISTICS OF AMORPHOUS  $Al_{65}Cu_{35}$   
BINARY ALLOY AND  $Al_{65}Cu_{35-x}Ti_x$  TERNARY  
ALLOYS PREPARED BY MECHANICAL ALLOYING  
OF ELEMENTAL POWDER.

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## ABSTRACT

Mechanical alloying is a novel solid state powder processing technique that allows production of homogeneous materials starting from blended elemental powder mixtures. This process offers the possibility of synthesizing materials that are difficult to be prepared by conventional method. The present study explores the milling and heat treatment condition in which the formation intermetallics compound occurs by mechanical alloying for Al-Cu (binary alloy) and Al-Cu-Ti (ternary alloys). This work is to conduct a preliminary study on the formation of amorphous alloy from Al-Cu binary system via mechanical alloying route and the effect the addition of Ti (X=5,10,15 at %) on the amorphization of this alloy. This work was also involving study on the characteristic of this amorphous phase. The elemental powder mixtures were milled with various milling intensity (milling time) in order to study the effect to milling intensity on milling time and phase evolution of mechanical alloyed powders. This binary alloy and ternary alloys were milled with various milling balls by a planetary ball mill and were sintered by vacuum furnace. These amorphous alloys were sintered at various temperatures for 1 hour. These microstructure and material properties of the HP compacts were investigated by optical microscopy, SEM (Scanning Electron Microscope), X-ray diffraction (XRD) and micro hardness measurement. It has been found that the microstructure mechanical properties of Hand press (HP) compacts were strongly dependent on the temperature and the starting powder composition. The increasing of temperature gave more refined structure.

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