

## Abstract

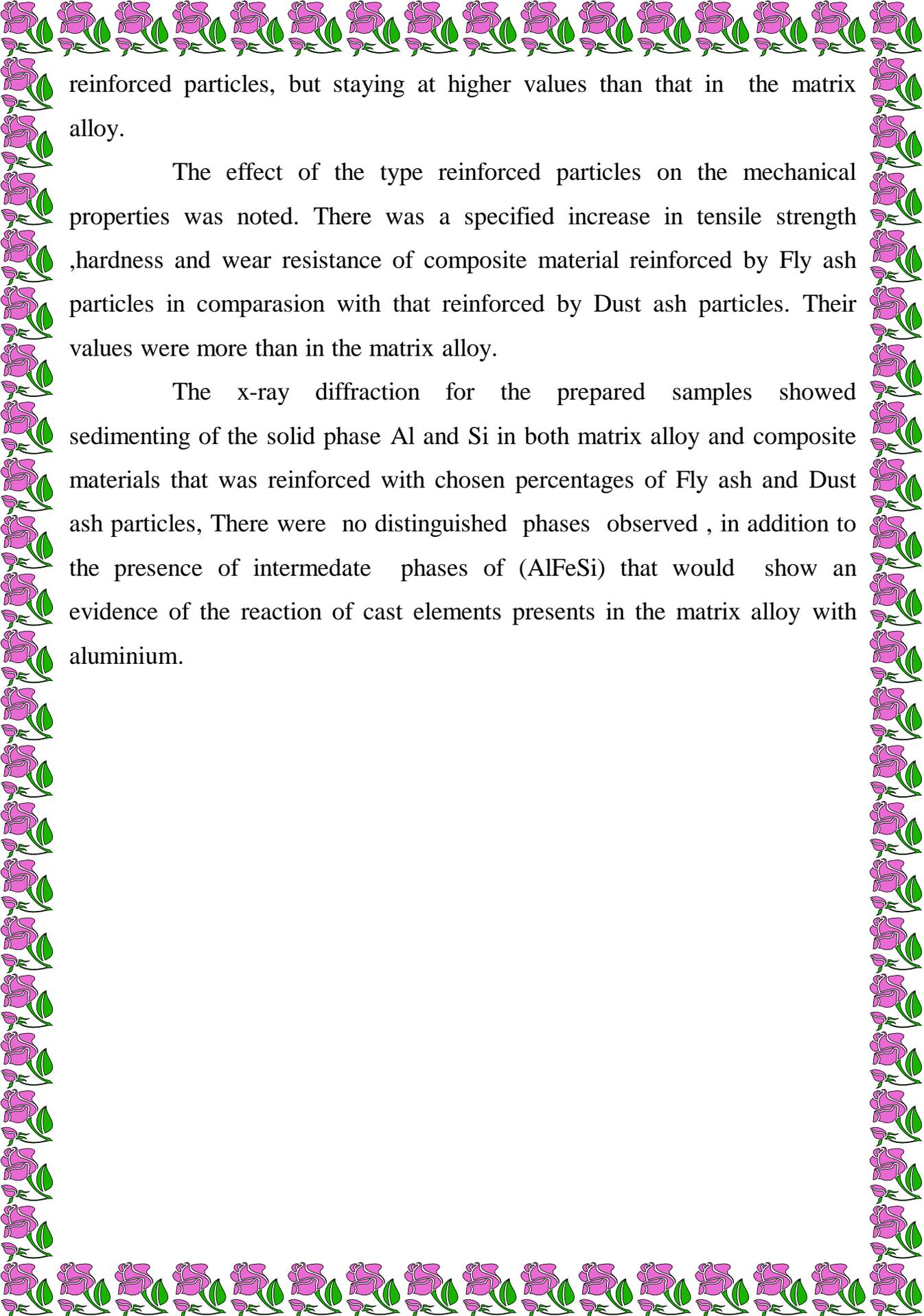
The present research had dealt with The preparation of bars with length of about(13cm)and a diameter of(2.5cm)of composite materisl with metal matrix represented by cast (Al-Si -Mg) alloy reinforced by Fly ash or Dust ash particles weight percentages (2,4,6,8%).

The matrix alloy and the composite materials were prepared by casting method using vortex technique in order to disperse The reinforced particles in homogeneous way through alloy matrix floor. In addition to that, two main groups of composite materials were prepared depending on the type of reinforced materials, the first group included composite material reinforced by Fly ash particles (0.454 $\mu$ m) while the second group included composite material reinforced by Dust ash particles (0.620 $\mu$ m).

Chemical analysis was done for matrix alloy ,Fly ash and Dust ash in order to know the structure details for each one . Concerning tests that were made for the prepared models, they included tensile test for base alloy and the composite alloy , hardness and wear test under vairos conditions for the prepared samples and microscopic in addition to x-ray diffraction examination in order to know the sedimented phases resulting from the process of dispersion of reinforced particles at matrix alloy floor .

The microscopic examination showed that the microscopic structure of the composite material has finer particles than that of the matrix alloy, The distributon of reinforced particles was nearly homogeneous at matrix alloy floor and the grains boundaries .

Results of tensile, hardness and wear tests showed that an increase in these properties with the increase in added percentage of



reinforced particles, but staying at higher values than that in the matrix alloy.

The effect of the type reinforced particles on the mechanical properties was noted. There was a specified increase in tensile strength, hardness and wear resistance of composite material reinforced by Fly ash particles in comparison with that reinforced by Dust ash particles. Their values were more than in the matrix alloy.

The x-ray diffraction for the prepared samples showed sedimenting of the solid phase Al and Si in both matrix alloy and composite materials that was reinforced with chosen percentages of Fly ash and Dust ash particles, There were no distinguished phases observed, in addition to the presence of intermediate phases of (AlFeSi) that would show an evidence of the reaction of cast elements presents in the matrix alloy with aluminium.