

IV. Conclusions

The primary aim of this research was to evaluate the possibilities of developing aluminum alloy based composites material for automobile piston application from carbonized coconut shell particle and silicon carbide particles using powder metallurgy method.

The following conclusion can be drawn from the study:

1. Preparation of Al6061-CCNS_p-SiC_p composites by powder metallurgy techniques is successful during the research work. Composite are produced by varying the composition of the various constituents. The composition of prepared composites are: 98%Al6061+2%reinforcement, 96%Al6061+4%reinforcement, 94%Al6061+6%reinforcement, 92%Al6061+8%reinforcement, and 90%Al6061+10%reinforcement.
2. Compaction of powder was successfully done at 450 kN using a 500 kN Capacity Compact hydraulic press.
3. Sintering of specimen was successfully done in a Muffle Furnace at 527°C for 1 hour.
4. On sintering hardness showed significant improvement.
5. A maximum tensile strength of 207.61 MN/m² was obtained, indicating an increase of 24% compared to the base alloy.
6. The coefficient of thermal expansion measured over the temperature range (27-200°C) turned out to decrease with increase in reinforcement particles in all composites specimen produced. A maximum decrease of 14.6% was observed compared to the base alloy.
7. The Microstructural Examination of developed composite materials using Scanning Electron Microscope (SEM) reveals uniform distribution of reinforcements within the alloy.
8. Finally it can be concluded that the develop composites showed a significant improvement in mechanical and thermal properties

Acknowledgment

The authors wish to acknowledge the authorities of Skills Acquisition Centre Yola, Ahmadu Bello University, Zaria and Modibbo Adama University of Technology, Yola for giving them access to their equipment during the course of carrying out this work.

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