**Paper No: PU-SOE-MECH- 11**

**Experimental Investigations on Mechanical and Wear Behaviour of 2014Al–Al2O3 Composites**

V.Bharatha, V.Auradib, M. Nagaralc, **Satish Babu Boppanad**

a.Siddaganga Institute of Technology, Visvesvaraya Technological University, Tumakuru, Karnataka, India

b.Siddaganga Institute of Technology, Visvesvaraya Technological University, Tumakuru, Karnataka, India

c.Aircraft Research & Design Centre, HAL, Bangalore, Karnataka, India

d.School of Engineering, Presidency University, Bengaluru, Karnataka, India

**Abstract**

In the existing exploration, an effort is being made to synthesize Al2O3p ceramic-reinforced 2014Al matrix composites by liquid stirring (Stir Casting) in order to contemplate the effect of Al2O3p on mechanical and wear properties of the prepared composites. The Al2O3p ceramic additional level is maintained at 9, 12 and 15 wt%. An innovative method of adding 2-stage reinforcements during liquid stirring is used throughout the course of preparation of each composite. An average particle size of 53 μm Al2O3p is used. By using scanning electron microscopy (SEM), microstructural characterization is performed for the above synthesized composites, which showed moderately uniform Al2O3p distribution with matrix grain refinement accompanied by X-Ray Diffraction (XRD) analysis. The hardness of the resultant composites is examined using Zwick micro hardness tester and the above synthesized composites are examined mechanically as per ASTM standards by means of computerized universal testing machine. With increment in wt% of Al2O3p, improvements in the value of hardness and tensile strength of the synthesized composites were seen. Percentage improvements of 28.88% (9 wt%), 43.36% (12 wt%) and 68.54% (15 wt%) in terms of hardness and 5.09% (9 wt%), 17.62% (12 wt%) and 29.03% (15 wt%) in terms of tensile strength were obtained ,respectively. The sliding wear test is carried out by using a computerized pin on a disc wear tester with counter surface as an EN31 steel disc (HRC60) and composite pin as specimens. The synthesized composites revealed the superior wear resistance property. Worn surfaces were studied with the help of SEM in order to know the wear mechanism. Overall investigation outcomes are very interesting and motivate to carry out further research work.

**Keywords:**

2014A1 alloy, Al203p, Ceramics, Liquid stirring, Hardness, Wear

**Publication Details:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Journal Name** | **Vol.** | **Month & Year**  | **Page No.** | **Publisher** | **Scimago Ranking** |
| Journal of Bio- and Tribo-Corrosion |  6 | March, 2020  | 133-144 | Springer | Q2 |