Scientia Iranica

Investigation of the Performance of Al-Composite developed from Industrial waste: A sustainable perspective

Neeraj Sharma[1], Dharmana Lokanadham[2,a,,*] , Rakesh Chandmal Sharma[3,4], Srihari Palli[3,b], K. Venkatasubbaiah[5], B. V. Ramana[6]

1. Production Engineering Department, National Institute of Technology Agartala, Tripura, India (kkrneeraj@gmail.com, +91-9306693726)
2. Mechanical Engineering Department, Aditya Institute of Technology and Management, Tekkali, India ([a]dloknadham@gmail.com, +91-9441914428) [*]Corresponding author ([b]srihari.palli@gmail.com,+91-9985660927)
3. Mechanical Engineering Department, Graphic Era (Deemed to be University), Dehradun, India (rcsharma.me@geu.ac.in, +91-8059930977)
4. Mechanical Engineering Department, Graphic Era Hill University, Dehradun, India
5. Department of Mechanical Engineering, Andhra University, Visakhapatnam, India (profkvsaumech@gmail.com, +91-9848063452)
6. Information Technology Department, Aditya Institute of Technology and Management, Tekkali, India (ramana.bendi@gmail.com, +91-9441053733)

Supplementary

Table S1: Effect of Load on CF and Wear for different composites (at D = 1500 m and V = 1.5 m/s)

	CF			**Wear (µm)**		
Load (N)	**10**	**30**	**50**	**10**	**30**	**50**
AL-alloy	0.147	0.236	0.384	214.2	411.1	547.7
AL-4%LSP	0.116	0.306	0.448	199.5	395	523
AL-8%LSP	0.101	0.285	0.408	184	291.9	508.9
AL-12%LSP	0.091	0.272	0.393	164	263	470.0
AL-16%LSP	0.112	0.276	0.408	191	341	511.6

Table S2: Effect of Load on WR and Hardness for different composites (at D = 1500 m and V = 1.5m/s) m/s)

	Wear Rate ($mm^3/m*10\text{^}3$)			**Vickers Hardness (HV)**		
Load (N)	**10**	**30**	**50**	**10**	**30**	**50**
AL-alloy	4.292	5.104	6.06	46.7	75.8	119.5
AL-4%LSP	3.875	4.396	5.70	67.5	120.5	291.9
AL-8%LSP	3.271	4.229	5.33	125.7	236.5	326.2
AL-12%LSP	3.270	4.292	5.229	166.4	276.3	370.9
AL-16%LSP	3.270	4.313	5.104	76.9	132.9	179.7

Table S3: Effect of Sliding distance on CF and Wear for different composites (at L=30N and V = 1.5 m/s)

	CF			**Wear (µm)**		
Sliding Distance	**1000**	**1500**	**2000**	**1000**	**1500**	**2000**
AL-alloy	0.202	0.237	0.355	411	409	498
AL-4%LSP	0.338	0.309	0.296	381	393	482
AL-8%LSP	0.313	0.282	0.273	208	288	464
AL-12%LSP	0.307	0.274	0.214	271	261	429
AL-16%LSP	0.289	0.274	0.285	318	338	465

Table S4: Effect of Sliding distance on WR and Harness for different composites (at L=30N and V = 1.5 m/s)

	Wear Rate (mm^3/m*10^3)			**Vickers Hardness (HV)**		
Sliding Distance	**1000**	**1500**	**2000**	**1000**	**1500**	**2000**
AL-alloy	6.705	5.03	4.221	83.94	70.80	109.4
AL-4%LSP	6.434	4.406	4.135	134.0	116.7	162
AL-8%LSP	6.090	4.135	3.619	191	234.3	271.5
AL-12%LSP	6.004	4.320	3.619	209.4	270.8	231.38
AL-16%LSP	6.336	4.430	3.902	104	129.19	130.65

Table S5: Effect of Sliding velocity on CF and Wear for different composites (at L=30N and D = 1500 m)

	CF			**Wear (µm)**		
Sliding Velocity	**1.0**	**1.5**	**2.0**	**1.0**	**1.5**	**2.0**
AL-alloy	0.224	0.236	0.228	363.9	405.5	388.0
AL-4%LSP	0.312	0.306	0.256	353.2	390.9	374.0
AL-8%LSP	0.295	0.282	0.236	224.5	285.4	266.1
AL-12%LSP	0.283	0.274	0.236	215.8	261.0	250.5
AL-16%LSP	0.280	0.274	0.236	291.0	334.5	317.4

Table S6: Effect of Sliding velocity on WR and hardness for different composites (at L=30N and D = 1500 m)

	Wear Rate ($mm^3/m*10\^3$)			**Vickers Hardness (HV)**		
Sliding Velocity	**1.0**	**1.5**	**2.0**	**1.0**	**1.5**	**2.0**
AL-alloy	3.140	5.030	4.328	56.8	65.0	123.8
AL-4%LSP	2.556	4.391	3.700	89.5	118.0	178.0
AL-8%LSP	3.383	4.136	3.894	111.0	232.0	247.0
AL-12%LSP	3.332	4.284	4.174	118.0	272.5	231.2
AL-16%LSP	3.064	4.430	4.021	94.5	172.3	195.3