

Multi-Objective Optimization of Wear Parameters of Tube Like Clay Mineral Filled Thermoplastic Polymer Using Response Surface Methodology

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Abstract : PTFE/HNTs nanocomposites are fabricated with 4%, 6%, and 8% by weight fraction, and the optimization study of wear parameters are performed using response surface methodology (RSM). The experiments are carried out on a pin on disc (POD) wear tester under different operating parameters planned according to Taguchi L27 orthogonal array. The input factors considered are wt% HNTs addition, sliding velocity, load, and distance with three levels for each factor. From ANOVA: The factors load, speed and distance and their interactions have a significant effect on COF. Also for SWR, composition factor and interaction of load and speed are observed to be significant (< 0.05) Optimum input parameters corresponding to desirability 1 are found to be: COF (0.11) and SWR $(17.5) \times 10^{-6}$ (mm³/N-m) at 6.34 wt% of composition, 5N of load, 2 km of distance and 1 m/sec of velocity.

Keywords : PTFE/HNT, nanocomposites, response surface methodology (RSM), specific wear rate

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