Abstract
Surface roughness has a negative impact on several failures of materials medium. It can accelerate the pitting corrosion, increase effective heat transfer and increase the rate of effective charge loss. However, controlled surface roughness may be desirable in many situations. The automotive lead-acid battery is a very sensitive application to such an effect. Cast-on-strap machine has the largest effect on the surface roughness of the alloy in our case study. The two-point correlation function is an efficient characterization tool for two-phase heterogeneous materials. Considering the nature that the two-point correlation function is a spatial statistical function, it cannot distinguish between a two-phase material or materials with surfaces containing protrusion of distinct heights. A case study to examine its capability in quantifying surface roughness is introduced. The possibility of applying simulated annealing procedure to optimize using information obtained from the two-point correlation function is investigated. Outcomes show a successful surface representation, as well as optimization, that agrees with the initially proposed hypothesis.