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### **Development of a battery desulfator oscillator to minimize sulfation in the lead acid battery**

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Sulfation is a term related to the lead-acid battery. It is the deposition of lead (IV) sulfate, which naturally grows on the electrodes in any lead-acid battery due to the chemical composition of the battery and other necessary physical conditions. Sulfation in a battery leads to degeneration of both the battery demand and efficiency. This study was carried out to find a mechanism to minimize the sulfation in the lead acid battery. Any particle or object can be vibrated by applying a signal with the frequency which is exactly equal to the resonance frequency of that particle or object. This natural phenomenon was the main idea behind this experiment. An electronic signal was utilized to resonate individual lead (IV) sulfate crystals in order to dissolve them. The experimental study basically consisted of three parts. The first part was understanding the working principle of a lead-acid battery and theoretical background behind the desulfation mechanism. The second part was to build a device capable of charging the lead acid battery properly and apply the above mentioned pulsating signal right after the general charging process. The final part was to test the effectiveness of the charging process and to verify whether the sulfation on the electrodes is reduced or not. The experimental results showed that the charging current (the current after 10 minutes while in charging process), which was utilized to test the effectiveness of charging process and desulfation mechanism, exhibited an almost constant value for each of 20 cycles of charging-discharging processes and the average value of that current was 1.008 A. Meanwhile in the control experiment, the charging current after 10 minutes in charging process had been decreased after some stage. If the charging process was incomplete and the desulfation by the pulsating signal was not performed properly, then the current which is recorded by the 50 PSOC method would be decreased when the cycle number is higher, because the sulfation will degrade the charge capacity of the electrodes, and therefore current drawn from the device will decrease. Finally, the experimental results showed that the desulfation process from the oscillating signal method was successful.

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