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Aluminum Nanoparticles Preparation via Plasma Arc Discharge

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Abstract:

The aluminum material has good material properties especially if the material is fabricated in nanoparticle size. This nanoparticle size suits well in electrolyte solutions in electric vehicle (EV) batteries. The problem with current EV batteries used in Tesla vehicles is high cost. Thus, there is a need for a cheaper process and material for production process of electrolyte in EV, which is the substitute by Al material. The next problem is in the nano synthesis method which is using common machines such as pulverized ball milling. This produces the nanoparticles in a larger size, i.e. larger than 109 m. The particles also tend to aggregate into larger particle clusters and lower the rates of dispersion. Synthesized nanofluids produce large particle diameters and not well-distributed suspension rates. Furthermore, the amount of nanoparticles produced is very limited. Hence, the objective of this research is to prepare an aluminum oxide (Al₂O₃) nanofluid via the plasma arc discharge nanofluid synthesis system (PADNSS) using Al material. The system of PADNSS was developed and the aluminum electrode was submerged in deionized water. The result obtained was three spots having different compositions, EDS spectrum view, and emission peak. From the three spots, shows that Spot 3 was selected due to emission peak and composition of aluminum supersedes compared to the other spots. Hence, this spot will be used for further development of the EV battery.