**Research Activities on Electric Power and Energy Materials in Universitas Indonesia**

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Our research group focuses the research activities on two main themes: electrical power system and energy-related materials. The first topics are devoted on the electrical energy management, economic and policy, utilization of renewable energy sources, and battery integration on power systems. We have developed novel concepts in distributing the electricity in particular for isolated islands/regions based on DC power supply to increase the energy efficiency harvested from solar power. Furthermore, we are successfully designed the DC-DC converter for personal computers, making it possible to be supplied by a rechargeable battery. Meanwhile for the topic of energy materials, we are interested in the electrode materials for anode and cathode of lithium-ion batteries and capacitors. Currently we are working on ZnO as anode materials for both lithium ion and hybrid capacitors. ZnO has been widely used in many applications, including transparent conducting materials, biosensors and anode materials of lithium-ion batteries owing to their unique properties. We investigated ZnO nanostructures using facile chemical bath deposition (CBD) of ZnO nanorods at copper (Cu) foils. During the synthesis, we controlled the uniformity, the density and the diameter of ZnO nanorods in order to find the optimum conditions. The effects of temperature annealing on the ZnO nanorods growth and crystallization were further investigated. Another interesting research topic is the use of activated carbon derived from biomass waste to be formed into porous materials for lithium based hybrid supercapacitors or lithium Sulphur batteries.