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Indonesia Toray Science Foundation
'RESEARCH PROPOSAL'

1. **Title** : AC Impedance Characterization of Inverted-type Hybrid Solar Cell with Aluminum doped ZnO as Electron Tacceptor Layer

2. **Research Team Leader**

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3. **Research Field** : Material Science/Organic Solar cell
4. **Number of Researcher(s)** : 2 (two)
5. **Research Location** : Padjadjaran University and Bandung Institute of Technology
6. **Time Allocation** : One Year (February 2012– Februari 2013)
7. **Research Grant** : Rp. 39,000,000,-
8. **Summary of Research Proposal (± 200 words)** :

An objective of the research is to study the physical process inside the cell that connected to the electrical properties at interface area between organic (polymer) and inorganic (ZnO) during illumination by use of AC impedance equipment. The physical process is including charge carrier generation, exciton dissociation, and charge transport, will be influenced directly by electrical properties of constituent materials. In fact, the photovoltaic performance is depending on these processes. This research will be divided into three main steps. First, is preparation of Al doped ZnO using sol gel methods and its characterization. Second is device fabrication using simple technique (spin coating) and thermal evaporation of top electrode. The last, is AC impedance measurement under simulated sunlight and its performance. An addition of aluminum dopant to ZnO layer as knowing will changes the electrical properties of ZnO, attributed to the enhancing the density of states near their Fermi energy level. For TCO application the thickness needed more than 100 nm, due to produce a higher conductivity. Practically we have been try to applied a several Al doped ZnO layer on glass substrate in order to get a lowest resistivity (1.2 Ω/cm^2) with the thicknesses about 300 nm. So that, in this work we try to use Al doped ZnO with 30 -50 nm thick as electron acceptor, that facilitate the dissociation exciton process and transport it to the electrode. Al dopant can reduce the surface roughness of ZnO layer, from this situation we estimate that using Al doped ZnO will produce a better junction in interface area between organic/inorganic layers. This result will be compared with our previous work (Undoped ZnO).