

**SINTESIS NANOKOMPOSIT Ag-SrTiO₃ DENGAN METODE
HIDROTERMAL MENGGUNAKAN EKSTRAK DAUN GAMBIR
(*Uncaria gambir* Roxb) SEBAGAI BIOREDUKTOR DAN SIFAT
HANTARAN LISTRIKNYA**

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ABSTRACT

NANOCOMPOSITE SYNTHESIS Ag-SrTiO₃ BY HYDROTHERMAL METHOD USING GAMBIR LEAVES EXTRACT (*Uncaria gambir* Roxb) LEAVES AS A BIOREDUCTOR AND ITS ELECTRICAL CONDUCTIVITY PROPERTIES

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Innovation in producing electrical energy needs to be done in the midst of depleting conventional energy sources, one of which is thermoelectricity. Thermoelectric generators are composed of thermoelectric materials that are usually made of metal oxides such as SrTiO₃ (STO) which can conduct electricity because they are included in semiconductor materials. Ag-SrTiO₃ has been synthesized with silver metal modification using hydrothermal method with the addition of gambir leaf extract as bioreductor and capping agent. XRD analysis showed Ag-SrTiO₃ nanocomposite was formed upon the addition of silver metal and leaf extract with sample code PSTO-E3. FTIR analysis showed the interaction of capping agent and Tert-Butyl Amin (TBA) with SrTiO₃ surface. This is shown at wave numbers 1588 cm⁻¹ and 1122 cm⁻¹ for TBA and 1466.32 cm⁻¹ showing asymmetric C-H and 854 cm⁻¹ for aromatic C-H from gambir leaf extract. Band gap measurements on STO and PSTO-E3 samples with UV-Vis DRS showed a decrease in band gap energy from 3.20 eV to 3.16 eV with the addition of silver and gambir leaf extract. The morphology of SrTiO₃ and PSTO-E3 was also studied through High Resolution Transmission Electron Microscopy (HR-TEM) showing that the STO and PSTO-E3 samples have a non-uniform morphology. The crystal size after the addition of gambir leaf extract is smaller than pure SrTiO₃. Electrical conductivity measurements showed that the electrical conductivity of the SrTiO₃ sample was 1,86 × 10⁻⁶ S/cm while the PSTO-E3 sample gave an electrical conductivity of 124,4 × 10⁻⁶ S/cm, where the electrical conductivity value of the PSTO-E3 sample increased 67 times greater than the sample without silver. This shows that the synthesis of Ag-SrTiO₃ with the addition of gambir leaf extract as a capping agent and bioreductor is able to form thermoelectric materials with better performance that can increase electrical conductivity.

Keywords: *Semiconductor, hydrothermal, bioreductor, capping agent, electrical conductivity*