Yun LU, Graduate School & Faculty of Engineering, Chiba University
URL: http://apei.tu.chiba-u.jp/Luyun-HP.html

New Energy
Environmental Conservation

Thermoelectric Materials
Materials for Environment Improvement

Composite, Nona, Porous, Coating

Experiment | Theory | Application | Simulation

Material Science, Powder Metallurgy, Applied Physics/ Chemistry, Semiconductor Engineering, Finite Element Method

Research Interests

New Energy

Environmental Conservation

Research and Application of Novel Materials and Devices for New Energy and Environment

- **Thermoelectric Materials and Device**

  West Heat, Geothermal Energy, Solar Heat → Electrical Power

- **Environment Improvement Materials**

  TiO_2 Photocatalyst →Anti-bacteria, Antifouling, Deodorant, Decomposition of Organic Pollutants

- **Structure/Functional Composite and Intermetallic Compounds**

Nano-technology, Composite, Porosity, Thermal Oxidation, Powder Metallurgy, Finite Element Method, Effective Medium Theory, Percolation Theory

Research Themes -1

1. Investigation, performance improvement and application of thermoelectric oxides

We are interested in fabrication, properties investigation, composite effect and application of thermoelectric oxides for high temperature. In order to achieve the aims, material techniques of nano, composite, MA, SPS, reduction treatment and non-stoichiometric are employed.

1) TiO_{2-x} thermoelectrics; Ti, Cu/TiO_{2-x} composite thermoelectrics
2) $CuAlO_2$ thermoelectrics
3) $Ni_{1-x}M_xO$ thermoelectrics
4) Investigations of the properties by FEM for composite thermoelectrics
5) Analysis of the properties by effective medium theory, percolation theory and rule of mixture

Research Themes -2

2. Fabrication, performance improvement and application of environmental clean-functional material – TiO_2 photocatalyst –

This research is focusing on fabrication, the activity and application, especially high performance and visible light sensitive of TiO_2 and TiO_2/metal composite photocatalysts. Material techniques of nano, composite, oxidation, porous, coating and doping are employed.

1) Fabrication and activity improvement of composite photocatalyst films by a novel coating process – Mechanical Coating Technique (MCT) –
2) Composite photocatalysts by powder metallurgy including SPS
3) Visible light sensitive of TiO_2
4) The activity evaluation of photocatalysts
5) Applications for environment conservation
6) Investigation and analysis of the formation of coating process in MCT