ITSF

Indonesia Toray Science Foundation
'RESEARCH PROPOSAL'

1. **Title** : Synthesis and Photocatalytic Properties of Ti deficiency of Cr doped $SrTiO_3$

2. **Research Team Leader**

Name	: **DR. UYI SULAEMAN**
Sex	: Male
Place/Date of Birth	: Karawang, July 5th, 1973
University/Institution	: Jenderal Soedirman University
Department/Faculty	: Mathematics and Natural Science/ Science and Technique
Address of Institution	: Kampus MIPA Jl. Dr. Soeparno, Karangwangkal, Purwokerto Central Java53123
Phone Number	: (0281) 638793
Fax Number	: (0281) 638793
Email Address	: uyisulaeman@gmail.com

3. **Research Field** : Catalyst
4. **Number of Researcher(s)** : 3
5. **Research Location** : Inorganic Chemistry Laboratory, Jenderal Soedirman University
6. **Time Allocation** : 1 year
7. **Research Grant** : Rp. 38,000,000,-
8. **Summary of Research Proposal (± 200 words)** :

The main purpose of this research is to generate visible light responsive photocatalyst of Ti deficient Cr-$SrTiO_3$. The visible light responsive photocatalyst of $SrTiO_3$ is designed by narrowing the band gap energy and generating the oxygen vacancy/crystal defect. The narrrowing band gap energy can be created by doping chromium into $SrTiO_3$ and the crystal defect can be induced by Ti deficient in the lattice. The synthesis of the photocatalyst can be performed by solvothermal reaction. Solvothermal reaction is an excellent method for nanocrystal synthesis because there is no gas pollutant produced during the synthesis. The titanium deficiency of Cr-$SrTiO_3$ powder is synthesized using $Ti(OC_3H_7)_4$, $SrCl_2{\cdot}6H_2O$ and $CrCl_3.9H_2O$ as the starting materials. An aqueous solution mixture of $SrCl_2{\cdot}6H_2O$ and $Cr(NO_3)_3{\cdot}9H_2O$ is slowly added into $Ti(OC_3H_7)_4$-2-prophanol solution followed by the addition of mixed solution of KOH methanol solution, oleic acid and water. Afterward the mixture is introduced into a Teflon vessel, and then the solvothermal reaction is carried out at 200°C. The powder products are characterized by DRS, XRD, SEM and BET. The photocatalytic activity is determined by measuring the concentration of methylene blue during the photo-irradiation using various types of monochromatic lights of 390 nm (UV LED), 445 nm (blue LED), 530 nm (green LED), and 627 nm (red LED) wavelengths. The concentration of methylene blue is determined using UV-vis spectrophotometer.