**Development of redox materials for the two-step water splitting process of thermochemical reaction with concentrated solar thermal energy for solar hydrogen production.**

**Prof Hiroshi Kaneko.**

**Professor.**

**Faculty of Engineering, University of Miyazaki, Gakuen-kibanadainishi1-1, Miyazaki, Japan.**

Miyazaki located in the south west of Japan has an abundance of solar energy, and the University of Miyazaki set up a beam-down solar concentration system to develop the technology for intensive use of concentrated solar thermal energy. This system can collect approximately 100 kW of thermal energy. We give importance to the development of solar fuel production in effective utilization of solar thermal energy. A solar reactor is being developed for the two-step water splitting process with cyclic redox ceramics to produce solar hydrogen. During the two-step water splitting process, the cyclic redox ceramics is reduced in the O2-releasing reaction around 1400 ºC in the reactor, and reduced ceramics is oxidized with steam in the following H2-generation reaction. The ceria (CeO2)-based reactive ceramics are prospective materials for the two-step water splittig process due to rapid hydrogen production, however, they are slowly reduced in the O2-releasing reaction. The perovskite type metal oxide (ABO3: A and B are metal elements) is attractive material as the redox material for the two-step water splitting process, because the diversity of perovskite compound with substitution of metal ion makes its reducibility changeable. The perovskite type cobalt and manganese oxides are prepared with substitution of metal ion in A-site and the favorable performance of hydrogen production is investigated.