The Efficiency Increase of Eco-Friendly DSSC Containing Visible Light Activity

Lee, Dabin (School: Changwon Sungmin Girls' High School)
Lee, Subin (School: Changwon Sungmin Girls' High School)
Jeong, Seo Yeon (School: Changwon Sungmin Girls' High School)

Procedure We experimented with the following content as below for achieving the purpose. 1. Measuring a photoelectric efficiency according to the size and crystal structure of TiO2 nanoparticle. 2. Measuring a photoelectric efficiency according to the type of a dye. 3. Extending the absorption wavelength of DSSC mixed with a natural dye. 4. Verification for a possibility of commercialization from the efficiency of DSSC according to the optimal extraction condition of a dye. Result and Discussion We made the DSSC according to the condition of a dye and verified the following result. 1. In the case of extraction of a dye using EtOH as a solvent at room temperature, the same pigment has high efficiency as the concentration of EtOH get higher. 2. In the case of mixing a natural dye, the absorbance area of visible light rises, so the efficiency increases as well. 3. In the case that N749 is mixed with Aronia, the efficiency increases by the durability and absorption growth of a dye. 4. Anthocyanin acid increases the efficiency by raising the absorbancy at 500 nm wavelength. 5. If the glasshouse is installed with DSSC, we expect the increase of efficiency of photosynthesis. We verified the efficiency increase by mixing N749 with a natural dye. We need additional experiments measuring the acidity and concentration rate of the suitable pigment for N749. If we research for the way to extract and process a dye to a durable structure like N749, we can make DSSC with higher efficiency from a natural dye. Ultimately, by using it, hydrogen production will be possible by the photolysis of water.

Awards Won: