

Solar Concentrator for Electro-Conversion of CO₂ to Solid Carbon

ABSTRACT

Capturing CO₂ gas and converting it to useful product offers an alternative in mitigating the CO₂ gas emission in atmosphere. The process is through electrolysis process in molten salt electrolyte to capture CO₂ gas and convert it to solid carbon. To avoid addition released of CO₂ gas through usage of electricity that mostly generated through fossil fuel burning, green energy from solar has been used for melting the electrolyte and running the electrolysis process. Thus, work has been focused in designing and developing a solar contractor for melting electrolyte and coupled with solar PV panel for driving the electrolysis process. One of the highlighted designs of solar concentrator is its ability to control the molten salt electrolyte temperature using Fresnel lens configuration. The heat energy generated from the solar concentrator melted the salt mixture of Li₂CO₃-CaCO₃-LiCl (salt melting temperature ~500 oC) and maintained at desired temperature of 550oC. Electrolysis or electro-conversion process in 180g carbonate salt electrolyte with stainless steel electrodes, and using solar photovoltaic, PV, panel with 12V/17AH battery had successfully produced solid carbon.