Device design and operation experiment for fluidized bed based solar hybrid process.

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Global electricity demand is expected to grow at an average annual rate of 2% from 20,577TWh in 2014, to 34,250TWh in 2040. By division, new types of consumption structures, including electric vehicles, are expected to increase rapidly in various sectors. Accordingly, development of renewable energy resources that can be used more sustainably than fossil resources is being actively pursued to meet stable energy demand. In particular, countries around the world are considering generating electricity using a solar hybrid process that can overcome the intermittent nature of renewable energy through large capacity heat storage. In this study designed a lab-scale solar storage system using fresnel lens for solar energy storage and confirmed that solar energy is stored in solid particles. Solar storage experiments were conducted by selecting not only sand but also alumina and SiC particles having excellent heat transfer properties as solar storage media. In addition, by considering the particle and gas rise temperature delivered according to the particle amount, the thermal energy obtained from the sun was calculated and the efficiency of the solar energy storage system was determined.