First simulation results of an ammonia-based solar thermochemcial energy storage system using the TRNSYS software

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A dish-based solar thermal energy storage system using the ammonia dissociation and synthesis reactions is investigated at the Australian National University (ANU). The economic potential of the system and latest experimental results of a 15 kW_{sol} system are reported in an associated paper (Lovegrove *et al.,* 1999). One line of investigation concerns the transient performance simulation of a dish-based solar thermal power plant using ammonia to assess the feasibility of such a proposed plant. The computer code TRNSYS, developed by the University of Madison,WI, was chosen as it offers attractive advantages which will be described in this paper. A solar thermal electric component (STEC) library has been created in joint effort by DLR, IVTAN and Sandia under the International Energy Agency (IEA) SolarPACES program (Pitz-Paal and Jones, 1999, Popel *et al.,* 1999). It includes a component library for Rankine cycle, Brayton cycle and solar system modelling. Standard TRNSYS components as well as some of these new models have been used in this study.

The objective of this paper is to present first simulation results of the ammonia system and to indicate future steps towards a full ammonia-based solar thermal power plant simulation.

Keywords: energy storage, solar chemistry, solar energy, solar thermal power generation, thermochemical energy conversion, TRNSYS.

References

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