



Status and challenges for molecular solar thermal energy storage system based devices Z. Wang, H. Holzel and K. Moth-Poulsen, *Chem. Soc. Rev.*, 2022, 51, 7313 DOI: 10.1039/D1CS00890K This article is licensed under a Creative Commons Attribution 3.0 Unported Licence. You can use material from this article in other publications without requesting further a?|



Papers by Kasper Moth-poulsen. Chiral dendrimer encapsulated Pd and Rh nanoparticles. *Chemical Communications*, 2008. of varying the ligand framework around the dinuclear core of FvRu2 in its function as a molecular solar thermal energy storage framework is presented. It includes DFT calculations probing the effect of substituents, other



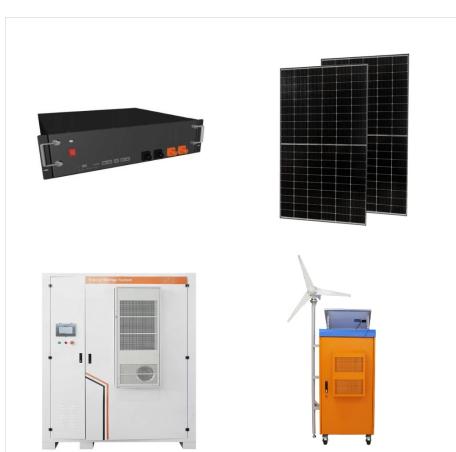
Campoy-Quiles, Kasper Moth-Poulsen
kasper.moth-poulsen@chalmers.se Highlights
ASi-basedPVcellwithaMOST i!ow cooling system
shows improved solar efi!ciency MOST solution
can store UV and visible light, achieving 2.3% solar
storage efi!ciency MOSTsolution,asanopticali!ter,
cools by 8 C and boosts PV cell efi!ciency by 0.2%
The a?|



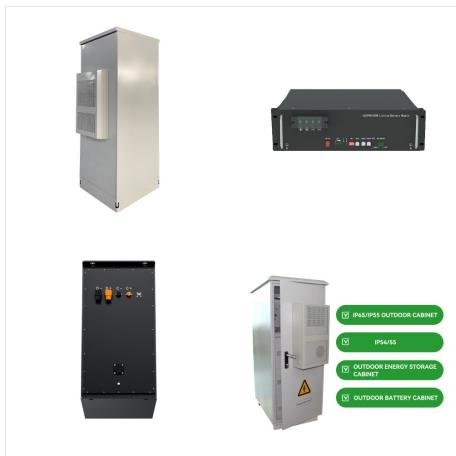
Molecular solar thermal energy storage (MOST) systems utilise molecular photoswitches that can be isomerized to a metastable high-energy state upon
Journal of Materials Chemistry A Recent Review
Articles Molecular Photoswitches for Energy storage
E-mail: kasper.moth-poulsen@upc . b Catalan
Institution for Research & Advanced Studies



Dr. Kasper Moth-Poulsen är Professor på
avdelningen för Tillämpad kemi. Hans forskargrupp
fokuserar på design och syntes av nya
själv-samlande material baserad på molekyl och
nano partiklar. Malet är att utveckla lösningar inom
en raka tillämpningar såsom enkelt molekyl
sensorer, fornybar energi, energilagring samt nano
medicin.



Molecular Solar Thermal Energy Storage
Applications Jessica Orrego-Hernandez, Ambra
Dreos, and Kasper Moth-Poulsen * Cite This: Acc.
Chem. Res. 2020, 53, 1478a??1487 Read Online
ACCESS Metrics & More Article Recommendations
CONSPECTUS: Renewable energy resources are
mostly intermittent and not evenly distributed
geographically; for this reason



Principal Investigator: Kasper Moth-Poulsen | Our Research Group focus on Synthesis and Testing of new materials for applications ranging from catalysis, and single molecule electronics to photon



combination of solar spectrum match and long term energy storage Martyn Jevric, Anne U. Petersen, Mads Manso, Sandeep Kumar Singh, Zhihang Wang, Ambra Dreos, and Kasper Moth-Poulsen*

Abstract



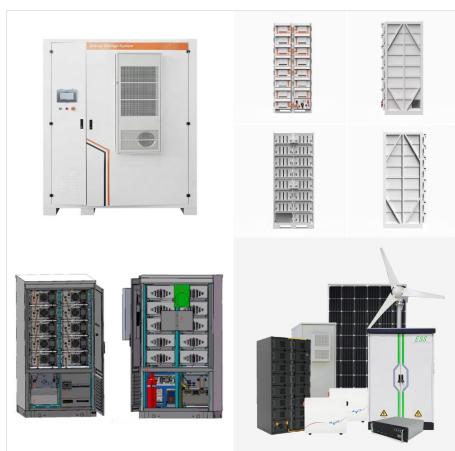
Kasper Moth-Poulsen *a The development of solar energy can potentially meet the growing requirements for a global energy system beyond fossil fuels, but necessitates new scalable technologies for solar energy storage. One approach is the development of energy storage systems based on molecular photoswitches, so-called molecular solar thermal



Kasper Moth-Poulsen joins the department of Chemical Engineering at the Polytechnic University of Barcelona (UPC) to setup a chemical energy laboratory. The article "Molecular solar thermal energy storage in photoswitch oligomers increases energy densities and storage times" is in TOP 50 Nature Communications chemistry and materials science



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Anders Lennartson, Anna Roffey, Kasper Moth-Poulsen The storage energy per azobenzene molecule increased by up to 30% compared to the free state, due to favourable interactions between close-packed molecules stabilising the E isomers relative Figure 1. Photo-induced dimerisation of anthracene and cyclisation of linked



Kasper Moth-Poulsen. Polytechnic University of Catalunya, Institute of Materials Science of Barcelona (ICMAB-CSIC) and. Molecular solar thermal energy storage in photoswitch oligomers increases energy densities and storage times. M Manso, AU Petersen, Z Wang, P Erhart, MB Nielsen, K Moth-Poulsen



A device for solar energy storage and release based on a reversible chemical reaction is demonstrated. A highly soluble derivative of a (fulvalene)diruthenium (FvRu 2) system is synthesized, capable of storing solar energy (110 J g a^{-1}) in the form of chemical bonds and then releasing it "on demand", when excited thermally or catalytically. A microfluidic device is also shown.



Molecular photoswitches can be used for solar thermal energy storage by photoisomerization into high-energy, meta-stable isomers; we present a molecular design strategy leading to photoswitches with high energy densities and long storage times. 412 96, Gothenburg, Sweden. kasper.moth-poulsen@chalmers.se. PMID: 29769524 PMCID: a2



Kasper Moth-Poulsen. Department of Chemical Engineering, Universitat Politecnica de Catalunya, EEBE, Eduard Maristany 10a??14, 08019 Barcelona, Spain. For solar energy storage applications, many different photoswitch moieties have been studied including azobenzenes, 1,



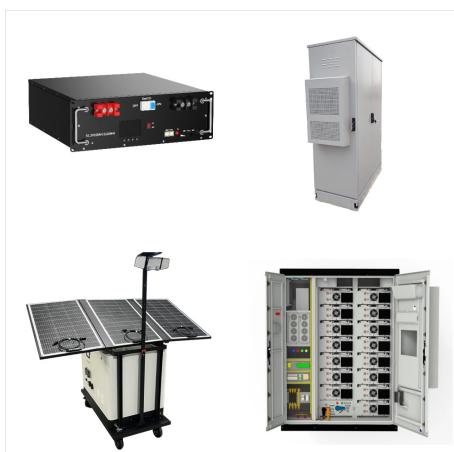
Her research project is centered on the design, synthesis, and characterization of organic compounds for solar thermal energy storage materials. Kasper Moth-Poulsen is an ICREA research professor at the Polytechnic University of Catalonia (UPC) and at the Institute of Materials Science of Barcelona, Spain (ICMAB-CSIC). He is also affiliated



Professor Kasper Moth-Poulsen (b. 1978-07-07) is a research leader in the field of nano-chemistry, energy storage materials and synthetic chemistry. His research activities focus on the development of methods to address single molecules and innovative technologies for solar thermal energy storage.



Kasper Moth-Poulsen is awarded the Chemical Society's prestigious Norblad-Ekstrand medal for his innovative research in the field of materials for energy conservation (Molecular Solar Thermal Management Materials). Our work on solar energy storage has been featured in the frontpage of Chalmers Magasin.



Orrego-Hernandez, Shima Ghasemi, Mariano Campoy-Quiles, and Kasper Moth-Poulsen. Figure S1. Synthetic Pathways towards the acetylene-derived starting materials for the herein used NBDs. a) synthesis route for 3-(naphthalen-2-yl)propiolonitrile, 3-(4- molecular solar thermal energy storage system. Energy Environ. Sci. 12, 187-193. <https://doi.org/10.1039/C8EE01030A>



Solar Energy Conversion and Energy Storage Materials Kasper Moth-Poulsen
kasper.moth-poulsen@upc.es Since the beginning of civilization, humanity has built houses to sustain comfortable living conditions throughout the seasons. In our modern society, about 50% of the total energy consumption is used for heating and cooling.



and Kasper Moth-Poulsen^{1,11 12 *} SUMMARY

Some molecular photoisomers can be isomerized to a metastable high-energy state by exposure to light. These molecules can then require different requirements (Figure 1). The energy storage cycle can be broken down into a series of four key processes (Aa??D) associated with two key quantities (DH storage and DHz).

An energy storage efficiency of up to 0.5% was reached at a flow speed of 4 mL h⁻¹ nearly identical to the indoor experiments using simulated sunlight (0.5%). Prof. Kasper Moth-Poulsen (). Materials availability. This is a?