

Materials Corrosion of High Temperature Alloys Immersed in 600°C Binary Nitrate Salt (SAND 2013-2526) Sandia National Laboratories (2013) ... Materials selection for thermal energy storage systems in parabolic trough collector solar facilities using high chloride content nitrate salts. Sol. Energy Mater. Sol. Cells, 163 ...

This paper reviews the corrosion problems of phase change materials (organic and inorganic) used as energy storage media in latent heat storage systems and compares the ...

well as in the pores of the Cr-depleted corrosion layer. For SS 310 containing 2 wt% Si, Si was also dissolved and corrosion products containing Si were observed in the pores of the corrosion layer. Based on these findings, an impurity-driven corrosion mechanism is proposed to describe the hot corrosion behavior of the studied alloys in molten ...

DOI: 10.1016/J.RSER.2018.01.010 Corpus ID: 116120314; Materials corrosion for thermal energy storage systems in concentrated solar power plants @article{Walczak2018MaterialsCF, title={Materials corrosion for thermal energy storage systems in concentrated solar power plants}, author={Magdalena Walczak and Fabiola Pineda and Angel G. Fernandez and Carlos ...

Salt hydrates used for latent heat storage: corrosion of metals and reliability of thermal performance. Sol. Energy (1988) A Sari et al. ... Preparation and properties of myristic-palmitic-stearic acid/expanded graphite composites as phase change materials for energy storage. Sol. Energy (2014) View more references. Cited by (43)

The corrosion behavior of aluminum 1060 in hydrated salt phase change materials (PCM) melts comprised of $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ - $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ was investigated through ...

This review provides recent updates on corrosion and degradation issues and their mitigation approaches in electrochemical energy storage and conversion devices, primarily PEM fuel cells, metal-ion and metal ...

The development of the new generation of concentrated solar power (CSP) plants requires improvements in the thermal energy storage systems, and corrosion produced is one of the main challenges to control since this can affect the costs of the electrical generation. Electrochemical impedance spectroscopy (EIS) has been applied in this research as a ...

Salt hydrates are an appealing option to be used as sorption materials in thermal energy storage (TES). In this work, strontium bromide and magnesium sulphate have been selected as one of the most ...

High temperature corrosion of molten salt containment materials is of great interest for thermal energy storage systems used with concentrating solar power. Mitigating ...

High temperature corrosion of molten salt containment materials is of great interest for thermal energy storage systems used with concentrating solar power. Mitigating this corrosion is critical for the design, life cycle and economics of these systems and requires understanding the mechanisms which drive corrosion.

Corrosion monitoring and mitigation techniques on advanced thermal energy storage materials for CSP plants Solar Energy Materials and Solar Cells, Volume 192, 2019, pp. 179-187 Angel G. Fernandez, Luisa F. Cabeza

DOI: 10.1016/J.SOLMAT.2018.12.028 Corpus ID: 104411095; Corrosion monitoring and mitigation techniques on advanced thermal energy storage materials for CSP plants @article{Fernandez2019CorrosionMA, title={Corrosion monitoring and mitigation techniques on advanced thermal energy storage materials for CSP plants}, author={{"A"}ngel G. ...

The increasing demand for energy storage and consumption has prompted scientists to search for novel materials that can be applied in both energy storage and energy conversion technologies.

Using phase change material (PCM) as the energy storage medium and applying it in a latent heat energy storage system has become an important way of new energy application. PCM has been widely used in various thermal storage applications around the world due to its high storage density, wide range of melting and solidification temperatures, and good ...

Solar energy is the most viable and abundant renewable energy source. Its intermittent nature and mismatch between source availability and energy demand, however, are critical issues in its deployment and market penetrability. This problem can be addressed by storing surplus energy during peak sun hours to be used during nighttime for continuous ...

Among various energy storage technologies, electrochemical energy storage is of great interest for its potential applications in renewable energy-related fields. There are various types of electrochemical energy storage devices, such as secondary batteries, flow batteries, super capacitors, fuel cells, etc. Lithium-ion batteries are currently ...

1 Introduction. Electrochemical energy storage and conversion (EESC) devices, including fuel cells, batteries and supercapacitors (Figure 1), are most promising for various applications, including electric/hybrid vehicles, portable electronics, and space/stationary power stations. Research and development on EESC systems with high efficiencies and low emission ...

Downloadable (with restrictions)! The thermal energy storage (TES) system using phase change materials (PCMs) has been studied since past three decades. PCMs are widely used in heat storage applications due to

their high storage density, as well as the wide range of melting and solidifying temperatures. Nevertheless, the main disadvantage of PCMs, especially salt ...

There are more studies on the corrosion of inorganic PCM and this type of corrosion widely exists in many energy storage fields, such as solar thermal storage systems [24], [25], buildings [26], [27] and low-temperature cold storage [28], etc. Dindi et al. [29] studied the corrosion of molten metal applied in CSP to metal containers at higher ...

The study suggests that P91 steel can serve as a structural material for the AlSi12 thermal energy storage system, and YSZ ceramic coating may act as a protective coating. It is recommended that the compatibility study between YSZ-coated P91 and molten AlSi12 be conducted beyond 120 h to examine microstructural changes on the coated surface.

Semantic Scholar extracted view of "Molten salt corrosion mechanisms of nitrate based thermal energy storage materials for concentrated solar power plants: A review" by G. Fernandez et al. ... (CSP) plants requires improvements in the thermal energy storage systems, and corrosion produced is one of the main challenges to ... Expand. 7.

The thermal energy storage (TES) system using phase change materials (PCMs) has been studied since past three decades. PCMs are widely used in heat storage applications due to their high storage ...

A typical TES is based on sensible heat storage consisting in heating a chemical reagent and storing it at the elevated temperature until generation of electricity is required; although latent heat storage involving the phase change materials (PCM) as storage medium or chemical storage harvesting thermal energy from endothermic reactions of ...

Molten chloride salts are promising high-temperature thermal energy storage (TES) and heat transfer fluid (HTF) materials in concentrated solar power (CSP) plan ... compared to the commercial nitrate salt mixtures. However, severe corrosion of structural materials in contact with chloride salts is one of the most critical challenges to limit ...

The active material coating influences the corrosion behaviour of aluminium depending on the coverage, thickness, chemistry and cut-off potential [132] of the active material as mentioned in Sections 2.2 and 2.4. In a real battery cell, the electrochemical performance is a superimposed product of the behaviours of both active materials and the ...

The use of molten-salt-based energy production and storage systems requires high-temperature corrosion- and creep-resistant structural materials. This study investigated the microstructure ...

The results will serve as a benchmark for electrode corrosion of other advanced energy storage materials, which is crucial for electrode engineering and performance modulation using interfacial ...

Recently, more and more attention is paid on applications of molten chlorides in concentrated solar power (CSP) plants as high-temperature thermal energy storage (TES) and heat transfer fluid (HTF) materials due to their high thermal stability limits and low prices, compared to the commercial TES/HTF materials in CSP-nitrate salt mixtures. A higher ...

Taking the preparation of thermal energy storage materials in quantities of 300 as an example, as shown in Fig. 9, the spherical SiC CPCMs suitable for batch casting have more cost advantage than ...

Cycle test stability and corrosion evaluation of phase change materials used in thermal energy storage systems. Author links open overlay panel Abhishek Anand a, Amritanshu ... Both the qualitative and quantitative methods are used for the corrosion analysis of the container's material. The corrosion rate is measured using the gravimetric ...

The thermophysical properties of thermal energy storage materials should be presented in the following aspects according to the given requirements of the application fields. ... be compatible with the PCM. For example, if the PCM is corrosive in case of few inorganic salts, the added conductive material should be corrosion resistant. 2.3.1 ...

We aim to reveal Al corrosion and resulting battery performance degradation in LIBs, which is significant toward the understanding of the high voltage stability of Al current collectors in various ...

Three metal materials exhibited different corrosion behaviors in the molten hydrated salt: brass had the largest corrosion rate of 0.218 mg/(cm² ·yr), ... Preparation and thermal properties of sodium acetate trihydrate as a novel phase change material for energy storage. Energy, 167 (2019), pp. 269-274.

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