

Notably, filling the activated carbon with a mixture of organic PCMs resulted in the highest temperature-moderating effect. The procedure and results presented in this study are expected to aid in further improvement in the performance of thermal storage media containing PCM where stable temperatures are required, including building heating and ...

DOI: 10.1016/j.jclepro.2020.122647 Corpus ID: 225591284; Energy performance of seasonal thermal energy storage in underground backfilled stopes of coal mines @article{Li2020EnergyPO, title={Energy performance of seasonal thermal energy storage in underground backfilled stopes of coal mines}, author={Baiyi Li and Jixiong Zhang and Seyed Ali Ghoreishi-Madiseh and Marco ...

The utilization of a heat storage functional backfill body to extract geothermal energy can organically combine backfill mining with geothermal resource exploitation technology, and promote the long-term sustainable development of the mining area. Based on the characteristics of heat storage backfill materials in the mine, low leakage rate stereotyped ...

Flooded mines constitute groundwater reservoirs that can be exploited with geothermal heat pump systems. Modelling such a reservoir is challenging because groundwater flow and heat transport equations need to be solved within the complex geometry of mine workings. To address this challenge, we developed a tridimensional numerical model to ...

The proposed energy storage system uses a post-mine shaft with a volume of about 60,000 m³ and the proposed thermal energy and compressed air storage system can be characterized by energy capacities of 140 MWh at a moderate pressure of 5 MPa. Important features of the system that determine high values of electric energy storage efficiency, in ...

Liu et al. [17] proposed to add compound shape setting phase change material (PCM) to filling slurry of the mine to solidify and form the functional backfill body of heat storage/energy storage, the phase change heat storage capacity of the backfill body with embedded heat exchange pipeline is carried out theoretically.

Rocks thermal energy storage is one of the most cost-effective energy storage for both thermal (heating/cooling) as well as power generation (electricity). This paper review ...

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voir for seasonal heat storage. At the moment a seasonal heat storage within an abandoned hard coal mine has

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not yet been realized in Germany. ~ erefore the HT-MTES (High Temperature-Mine ~ ermal Energy Storage) project (feasibility study) of the International Geothermal Centre (in cooperation with RAG AG and delta h Ingenieurgesellschaft)

Kurnia et al. [29] proposed a rotating phase change energy storage device, which showed that the rotation did improve the heat transfer performance of the phase change energy storage device, and the heat transfer efficiency in the energy storage and energy release processes was increased by 25 % and 41 %, respectively.

Germany Mine Thermal Energy Storage pilot plant for the energetic reuse of summer surplus heat from Concentrated Solar Thermal (max. 80°C; ΔT : 50-60 K) for heating buildings in winter. 45 kW 165 MWh to 8 Belgium Demand side management (DSM) of a geothermal heating network, including assessment of adding thermal storage 3 GWh/y ...

The results obtained from the validated numerical model highlighted the importance of surrounding rocks in underground mine thermal energy storage by comparing the energy performances with ...

Seyed Ali Ghoreishi-Madiseh et al. / Energy Procedia 75 (2015) 2093 - 2098 2095 Fig. 1. (a) Mid-plane view of rock pit and trenches; (b) 3D view of the rock pit and trenches; not the same ...

In 2015, Ghoreishi et al. (Ghoreishi-Madiseh et al., 2015) first combined BTES (Borehole Thermal Energy Storage) with backfilling mine to collect and store mine geothermal energy, and used heat exchange pipes to extract ... There is a lack of research on the heat exchange performance of horizontal heat exchangers applied to mine filling, and ...

DOI: 10.1016/j.nbuildmat.2020.120340 Corpus ID: 225149348; Numerical simulation on heat storage performance of backfill body based on tube-in-tube heat exchanger @article{Zhang2020NumericalSO, title={Numerical simulation on heat storage performance of backfill body based on tube-in-tube heat exchanger}, author={Xiao-yan Zhang and Min Zhao ...

The challenge of high temperatures in deep mining remains harmful to the health of workers and their production efficiency. The addition of phase change materials (PCMs) to filling slurry and the use of the cold storage function of these materials to reduce downhole temperatures is an effective approach to alleviate the aforementioned problem. ...

Zhang, X., et al.: Numerical Simulation of Heat-Storage Performance of ... 4610 THERMAL SCIENCE: Year 2023, Vol. 27, No. 6A, pp. 4609-4624 damage and solid waste in deep mines, Park [5] reviewed et al. the recent advancements in domestic mine recycling and the utilization of mine waste. Wang [6] proposed a et al. recycling economy model and filling body system for ...

The results revealed that reducing the initial heat-storage temperature of filling body, increasing surrounding

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rock temperature and increasing the airflow temperature in the stope all effectively ...

Thermal energy storage is crucial in improving the utilization efficiency of intermittent renewable energy. The extensive cavities created by ores/coal extraction in underground mines provide a ...

However, it has poor thermal stability and low energy storage efficiency, which indicate that part of its energy can be lost during the discharge process. Based on the excellent high temperature performance ... When the filling amount of BZCT NFs increases to a certain extent, the probability of the fibers ending up and connecting is greatly ...

Critical review of thermal energy storage in district heating and cooling systems. ... In the first case the storage is used to fill the daily peak request; they have usually a duration varying from some hours to a day. Long-term TES allows storing energy for long times, from several weeks to months. They are mainly use to make available heat ...

The phase change heat storage process of layered backfill body embedded with smooth/finned double-pipe heat exchanger is simulated by FLUENT. The temperature field change and phase change heat storage characteristics of TLBB, MLBB and BLBB in the heat storage process are analyzed, and the phase change heat storage capacity of smooth/finned

A phase-change material was added to filling materials in an appropriate proportion to realize the effective collection and storage of geothermal energy. Based on the theory of heat transfer and ...

1174 J. Therm. Sci., Vol.32, No.3, 2023 Table 1 Dimensions of filling body and heat exchanger Item Value Length of calculation domain, L 500 mm Width of calculation domain, W 380 mm Height of calculation domain, H 120 mm Diameter of inner space, d1 4 mm Diameter of annular space, d2 28 mm Tube spacing, S 120 mm slurry was prepared with tailings from a gold mine in

Basic principle for a cavern storage power plant in a salt dome with high-pressure and low-pressure cavern and sCO₂ turbine/compressor in mine (HPC high-pressure cavern, LPC low-pressure cavern)

Thermal energy storage systems, however, always provide lower energy consumption costs and contribute positively to sustainability indices. For these reasons, governments and electricity distribution companies are using incentive practices to spread the use of heat storage systems. ... Caves and abandoned mines may technically be considered to ...

Thermal storage of the energy is essential for district heating systems to mitigate intermittency related issues. The extensive cavities created after extraction of ores/coal in mines could ...

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