

What is aluminum based energy storage?

Aluminum-based energy storage can participate as a buffer practically in any electricity generating technology. Today, aluminum electrolyzers are powered mainly by large conventional units such as coal-fired (about 40%), hydro (about 50%) and nuclear (about 5%) power plants ,,,.

What is the feasibility study of aluminum based energy storage?

To provide the correct feasibility study the work includes the analysis of aluminum production process: from ore to metal. During this analysis the material and energy balances are considered. Total efficiency of aluminum-based energy storage is evaluated. Aluminum based energy generation technologies are reviewed.

Why is aluminum a good source of energy?

Although aluminum production is very energy intensive process with high greenhouse gas emissions, some physical-chemical properties of aluminum are very attractive for energy storage and carrying. Among them there are zero self-discharge and high energy density. Aluminum can be stored for a long time and transported to any distance.

What is the calorific value of aluminum based energy storage?

Calorific value of aluminum is about 31 MJ/kg. Only this energy can be usefully utilized within aluminum-fueled power plant. So, it shows the efficiency limit. If 112.8 MJ are deposited, the maximum cycle efficiency of aluminum-based energy storage is as follows: $31 \text{ MJ} / 72.8 \text{ MJ} = 43 \%$. This percentage represents the total-thermal efficiency.

Are aluminum-based energy storage technologies defensible?

The coming of aluminum-based energy storage technologies is expected in some portable applications and small-power eco-cars. Since energy generation based on aluminum is cleaner than that of fossil fuel, the use of aluminum is defensible within polluted areas, e.g. within megapolises.

Is aluminum a good energy storage & carrier?

Aluminum is examined as energy storage and carrier. To provide the correct feasibility study the work includes the analysis of aluminum production process: from ore to metal. During this analysis the material and energy balances are considered. Total efficiency of aluminum-based energy storage is evaluated.

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