

Is a nitrogen economy feasible?

We showed that a nitrogen economy, where renewable hydrogen is chemically stored on abundant nitrogen in the form of a nontoxic and safe nitrogen-based alternative fuel, is energetically feasible, and that novel nitrogen-based fuels are comparable on an energy-return basis to existing carbon-based fuels.

Does liquid air/nitrogen energy storage and power generation work?

Liquid air/nitrogen energy storage and power generation are studied. Integration of liquefaction, energy storage and power recovery is investigated. Effect of turbine and compressor efficiencies on system performance predicted. The round trip efficiency of liquid air system reached 84.15%.

What is a nitrogen economy?

The nitrogen economy is a proposed future system in which nitrogen-based fuels can be used as a means of energy storage and high-pressure gas generation.

Are nitrogen based fuels more sensitive to water splitting?

All nitrogen-based fuels had a similar sensitivity to the required energy for atmospheric N_2 separation. Nitrogen-based fuels were more sensitive to a change in the required energy for water splitting than carbon-based fuels; nevertheless, methane had a relatively high sensitivity coefficient as well.

How to recover cryogenic energy stored in liquid air/nitrogen?

To recover the cryogenic energy stored in the liquid air/nitrogen more effectively, Ahmad et al. [102,103] investigated various expansion cycles for electricity and cooling supply to commercial buildings. As a result, a cascade Rankine cycle was suggested, and the recovery efficiency can be higher than 50 %.

Are nitrogen-based fuels more efficient than carbon-based?

Nitrogen-based fuels were more sensitive to a change in the required energy for water splitting than carbon-based fuels; nevertheless, methane had a relatively high sensitivity coefficient as well. As a result, more efficient future water-splitting technologies will give a slight energetic advantage to the nitrogen-based fuels.

This study delves into investigating the synergistic integration of the single-effect SMR cycle with two distinct energy sources: liquefied air energy storage systems ...

Lithium-ion batteries (LIBs), due to their excellent electrochemical properties, are extensively utilized in energy storage power stations, new energy electric vehicles, and ...

The escalating energy crisis and environmental pollution have highlighted the importance of clean and efficient renewable energy sources. Developing large-scale energy ...

1 Introduction. The current energy change toward renewable electricity requires novel energy storage on a new scale. The discovery of graphite as an excellent and abundant ...

In the field of energy storage, NGO nanosheets are found to exhibit a good electrocatalytic activity and superior stability and these properties are better than currently used commercial Pt/C ...

The multistage porous structure in NBKCC can promote energy storage and dye molecule storage, while functional group characteristic adsorption and gained ...

Acidification occurs during the temporal storage and long-distance transportation of food waste (FW). It can influence FW physicochemical properties and even ...

Effects of nitrogen, sulphur, and temperature treatments on the spectral, structural, and electrochemical characteristics of graphene oxide for energy storage ...

Among large-scale energy storage technologies, the cryogenic energy storage technology (CES) is a kind of energy storage technology that converts electric energy into cold ...

"This promising research on a nitrogen fixation battery system not only provides fundamental and technological progress in the energy storage system but also creates an ...

5 ???· The use of liquid air or nitrogen as an energy storage medium can be dated back to the nineteen century, ... Two operation modes were proposed for the air liquefaction process to ...

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