Patent Search

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Abstract:

ADVANCED POWER GENERATION MATERIAL AND PROCESS DESIGN BY ARTIFICIAL INTELLIGENCE ABSTRACT The industrialization of every country is heavily dependen power usage. Global electric power consumption has had a 4.5% increase in 2021, notwithstanding the impact of the COVID-19 issue. The International Energy Agenc world energy statistics report states that fossil fuels accounted for 63.1% of the overall energy supply, with coal contributing approximately 36.7% to global power ou The energy sector is a primary contributor to the release of CO2 into the atmosphere, and this will continue to be a serious issue until 2050, particularly for poor nati emphasised in the recent IEA report on achieving net-zero emissions by 2050. By 2050, the global demand for energy is projected to increase by 80%, with poor coun accounting for over 85% of this growth. Although renewable energy-based power generation systems are expanding, coal will continue to play a substantial role in su energy needs of impoverished countries until 2050. Additional information regarding the overall electricity generation and carbon dioxide emissions patterns throug global areas can be found in the Supporting Information. The persistent reliance on coal can be attributed to several factors, including its affordability as a fuel, the p known technology for converting coal into energy, the comparatively rapid installation of coal-fired power plants, and the socio-economic and political obstacles face nations. We commence by delineating the cutting-edge AI models utilised in materials design, encompassing machine learning (ML), deep learning, and materials info tools. These approaches facilitate the retrieval of significant insights from extensive datasets, empowering researchers to unveil intricate connections and patterns in qualities, structures, and compositions. Following that, a thorough examination of materials design propelled by artificial intelligence is presented, emphasising its po future opportunities. Through the utilisation of AI algorithms, researchers may effectively explore and examine datasets that encompass a diverse array of material q allows for the identification of potential candidates that show promise for certain applications. This ability has significant ramifications in diverse sectors, ranging fro pharmaceutical research to energy storage, where the performance of materials is of utmost importance. In the end, AI-driven methods have the potential to comple transform human comprehension and creation of materials, leading to a new era of rapid invention and progress.

Complete Specification

Description:DESCRIPTIONS:
The incorporation of artificial intelligence (AI) algorithms into materials design is transforming the field of materials engineering due to their ability to forecast mate characteristics, create novel materials with improved attributes, and uncover new mechanisms that go beyond human intuition. Furthermore, they can be utilised t intricate design principles and expedite the identification of superior candidates more efficiently than through trial-and-error testing. In this context, we will explai these technologies can expedite and enhance every phase of the process of discovering new materials with improved characteristics. We commence by delineating cutting-edge AI models utilised in materials design, encompassing machine learning (ML), deep learning, and materials informatics tools. These approaches facilita retrieval of significant insights from extensive datasets, allowing researchers to unveil intricate relationships and patterns among material qualities, structures, and compositions. Subsequently, a thorough examination of materials design propelled by artificial intelligence is presented, emphasising its potential future opportur Through the utilisation of AI algorithms, researchers may effectively explore and examine databases that encompass a diverse array of material qualities. This facili identification of highly favourable candidates for certain applications. This skill has significant ramifications across many industries, ranging from pharmaceutical r to energy storage, where the performance of materials is of utmost importance. In the end, AI-based methods are positioned to completely transform human comprehension and creation of materials, introducing a fresh period of expedited invention and progress. The progress of human civilization heavily depends on th of materials design, which has substantial impact in various domains, spanning from civil engineering to regenerative medicine. In the past, the identification and development of novel materials heavily depended on fortuitous encounters and the iterative process of testing guided by practical knowledge, often resulting in un discoveries. The process of materials discovery often consists of several distinct phases. Initially, researchers ascertain a distinct study issue or target. Subsequer

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