

Solar energy adsorption of radionuclides in the sea for power generation

Why are radionuclides released into the marine environment?

Since the dawn of the nuclear age in the 1940s, accidents involving military aircraft, military and civilian vessels, the re-entry of satellites and spacecraft as well as the loss of industrial sealed sources have led in some situations to the release of radionuclides into the marine environment 57 (Box. 5).

How much solar radiation does the ocean receive?

The oceans, covering more than 70% of the earth's surface area, receive a large fraction of the incident solar radiation. Research on effectively utilizing both solar radiation and wave energy together is needed, but currently lacking.

How do radionuclide pathways work in the marine environment?

In the case of the marine environment, radionuclide pathways depend on sources (wet and dry atmospheric deposition, direct releases due to regular or accidental discharges from nuclear installations, rivers, etc.), dispersion by currents and uptake by sediments and biota.

Can fiber-supercapacitors capture wave/solar energy from oceans?

Several fiber-supercapacitors are integrated with the shadow-tribo-effect nanogenerator to form a self-charging power system. To capture and store wave/solar energy from oceans, an energy ball based on the self-charging power system is demonstrated.

Why are Radionuclides deposited on the sea surface?

Radionuclides may be deposited on the sea surface due to atmospheric fallout (dry and/or wet deposition) or directly introduced into the sea from a point source due to releases from a given industrial facility (chronic or accidental), an accident in a nuclear vessel etc.

Are solar cells a viable energy source for underwater power generation?

One of the most promising demonstrated technologies for onboard underwater power generation is solar cells. Solar energy is a consistent source of energy above the ocean surface, but also a surprisingly abundant and consistent source of energy below the ocean surface 9.

This study builds a model to predict distribution coefficients (K_d) using the random forest (RF) method and a machine learning model based on the Japan Atomic Energy Agency Sorption Database (JAEA-SDB). A database of ...

The inner wall of the bottle is soaked with dilute hydrochloric acid with $\text{pH} = 1$ in advance to reduce the adsorption loss of radionuclides. Seven kinds of radionuclides were measured, including ^{58}Co , ^{60}Co , ^{134}Cs ...

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Mapping of the global potential of atmospheric water harvesting using solar energy shows that it could provide safely managed drinking water for a billion people worldwide based on ...

Nuclear power plants play a key role in meeting the increasing energy demand with continuous energy generation as a base load source. Liquid radioactive waste (LRW) is generated as a ...

Hydrogels have demonstrated great solar-powered water evaporation potential, but highly efficient and specific target extraction remains to be expanded. Here, we report the simultaneous highly efficient seawater ...

The hot water output of the solar system is used to drive the ORC unit and adsorption chiller in four configurations; (Conf-1) hot water drives the adsorption chiller, then ...

Radioactive wastes are generated from nuclear reactions, nuclear power generation, mining activities, and nuclear by-products from medicine and scientific research (Adebiyi et al., 2021; ...

1 ??· Under the term of electricity generation, there are many kinds of production processes [].Some processes use fossil fuels, some from natural resources (water and air), and some ...

Ara et al. (2021) devised a two-tiered framework to evaluate the techno-economic viability of hybrid offshore wind and solar photovoltaic (PV) power generation systems. This assessment ...

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Energy transfer with solar energy as the original energy and the conversion of water energy in the desalination process together constitute the energy flow of the SDIE ...



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